Profiling the Manufacturing Sector in Newfoundland and Labrador

Canadian Manufacturers & Exporters

Newfoundland & Labrador Division

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PROFILING

THE MANUFACTURING SECTOR

IN NEWFOUNDLAND AND LABRADOR

Economics and Statistics Branch
Department of Finance
Government of Newfoundland and Labrador
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EXECUTIVE SUMMARY

The manufacturing sector makes a significant contribution to the Newfoundland and Labrador economy. In 2001, this sector directly accounted for 7.8% (16,400 person years) of provincial employment and 6.4% ($732.2 million 1997$) of total real Gross Domestic Product (GDP).

Photo credit: Eric Walsh, courtesy of Industry, Trade and Rural Development
Terra Nova Shoes started as a family business 25 years ago in Harbour Grace. Today, in addition to its lines such as *Wildsider*, Terra Nova produces private brands for major shopping chains such as *Dakota Footwear* for Mark's Work Wearhouse, *Wearmaster-Lites* for Sears, *Polar Bear* and *Texas Steer* for K-Mart, and safety boots for the Collins and ISECO labels.

The province's manufacturers have been successful in capitalizing on opportunities arising from the liberalization of trade barriers and in pursuing areas of comparative advantage. Trade barriers throughout the world have been reduced over the past decade, particularly in North America with the North American Free Trade Agreement. As a result, new and larger markets are now open to local manufacturers. Success in these markets lies in specialization in areas of comparative advantage. Further, comparative advantage may be enhanced and created in other areas through increased investment, innovation and the use of state-of-the-art technologies. In recent years, this success is evidenced by a 13.0% increase in manufacturing real GDP between 1996 and 2001. Growth has been driven by increased international and interprovincial exports (up 20% between 1996 and 2001) and facilitated by high levels of real capital investment (averaging $125.2 million between 1996 and 2001 compared to an average of $77.5 million for the 1991 to 1995 period).

In the context of this growth, Canadian Manufacturers & Exporters, Newfoundland and Labrador (CME-NL) commissioned the Economics and Statistics Branch to compile a detailed statistical profile of manufacturing in this province and to analyze the sector's performance relative to the three Maritime provinces and Ontario for the period 1996 to 2001. CME-NL also requested an assessment of the economic impact of manufacturing on the provincial economy in terms of its direct, indirect and induced economic benefits. According to CME-NL, completion of these tasks would provide a comprehensive overview which may be used to:

- provide new and more detailed information to identify how well provincial manufacturers are performing in comparison to other provinces;
- assist local manufacturers in taking advantage of the federal innovation strategy;
- form the basis for: (i) new data and data sources to be developed; (ii) development of a provin-

cial-level methodology that could be duplicated and expanded upon by other jurisdictions, and (iii) local stakeholders to develop expertise and become leaders in this area of analysis;
- provide benchmark data sources from which future analysis can be conducted and changes over time observed; and
- assist in policy and program formulation.

In terms of measuring Newfoundland and Labrador's performance relative to other provinces, the analysis followed a methodology previously developed and used by Canadian Manufacturers & Exporters (CME) in 2001 to compare the national manufacturing sector to other G-7 countries. The results of that study indicated that performance in the Canadian manufacturing sector was the weakest in the G-7 (the leader was the United States). The 10 indicators used in this study are:

- growth in manufacturing real gross domestic product (GDP) (*the CME study used growth in industrial production*);
- growth in real manufactured exports (*this indicator is excluded from the performance ranking in this study due to the unavailability of data for Prince Edward Island and New Brunswick*);
- change in manufacturers' selling prices (*this indicator is excluded from the performance ranking in this study due to the unavailability of data for Prince Edward Island and New Brunswick*);
- labour productivity growth in manufacturing;
- change in manufacturers' unit labour costs;
- manufacturers' before-tax profit margins (*the CME study used after-tax profit margins*);
- investment in machinery and equipment as a percent of real GDP in manufacturing;
- skills training investment as a percent of payroll for all industries;
- R&D investment as a percent of real GDP in the business sector; and
- rate of new product commercialization (U.S. patents) in the business sector.

Readers should note that there are several weaknesses associated with this methodology, including: equal weights are applied to each indicator regardless of its importance to overall performance; performance ratings are sensitive to the reference period chosen; some data have high margins of statistical errors; and differences in industry composition across provinces make interprovincial comparisons difficult to interpret. Nevertheless, the methodology and indicators are comprehensive and instructive, and provide valuable insight on manufacturing performance in the five provinces studied.

Using the CME methodology for the 1996 to 2001 period, the manufacturing sector in Prince Edward Island performed the strongest among the provinces in this study. Led by new capital investments, Prince Edward Island's food manufacturing industry expanded significantly over the reference period, and overall performance in that province was aided by the completion of the Confederation Bridge in 1997. Ontario ranked second, followed by Nova Scotia, New Brunswick, and Newfoundland and Labrador, respectively. The overall Canadian performance was marginally stronger than that of Ontario, aided by a strong manufacturing performance in Quebec.

Newfoundland and Labrador performed relatively well with respect to three of the eight indicators used in the overall performance ranking. The three were before-tax profit margins, skills training investment, and investment in machinery and equipment. The province's performance was relatively weak, however, in the remaining five (real GDP growth, labour productivity growth, change in unit labour costs, business sector R&D investment and new product commercialization in the business sector). While change in manufacturers' selling prices was not included in the overall ranking due to the unavailability of data for Prince Edward Island and New Brunswick, Newfoundland and Labrador was the jurisdictional leader among the provinces for which data were available.

Provincial Performance Ranking
Manufacturing, 1996-2001

Province	Overall Performance	Performance Gap (relative to Prince Edward Island)
Prince Edward Island	77.2%	n.a.
Ontario	63.9%	-13.3 points
Nova Scotia	58.3%	-18.8 points
New Brunswick	56.9%	-20.3 points
Newfoundland & Labrador	37.7%	-39.5 points
Canada	65.1%	-12.1 points

Note: Refer to Section 1.3 for methodology.

With respect to economic impacts, this report examined the impact of the manufacturing sector on real GDP, employment and real labour income in Newfoundland and Labrador. The direct real GDP impact of manufacturing activity was $732.2 million in 2001, or 6.4% of total economic activity. Four industries (seafood, newsprint, other food, and refined petroleum production) accounted for almost 67% of direct real GDP in manufacturing in 2001. The total GDP impact (direct, indirect and induced impacts), was $1.69 billion, or 14.8% of total economic activity.

Direct employment in the manufacturing sector was 16,400 person years in 2001 or 7.8% of total employment. Almost 66% accrued to seafood, newsprint, other food, and refined petroleum production. The total employment impact was about 38,500, or 18.2% of total provincial employment.

Direct real labour income from manufacturing was about $560.1 million in 2001, or 9.1% of total labour income. Seafood, newsprint, other

Summary of Economic Impacts
Manufacturing, 2001
Newfoundland and Labrador

	Direct Impact		Total Impact	
Indicator	Value	*% of Total Economy*	Value	*% of Total Economy*
Real GDP (1997$)	$732.2 m	6.4%	$1.69 b	14.8%
Employment (person years)	16,400	7.8%	38,500	18.2%
Real Labour Income (1997$)	$560.1 m	9.1%	$1.09 b	17.6%

Note: Total impact is the sum of direct, indirect and induced impacts. See Section 4.1 for explanation of direct, indirect and induced impacts.

Photo credit: Newfoundland and Labrador Statistics Agency
North Atlantic's oil refinery in Come By Chance is closer to international sources of crude in the North Sea, West Africa, and the Arabian Gulf, than any other refinery in North America.

food, and refined petroleum production accounted for 62.7% of direct labour income in manufacturing. The total real labour income impact was just over $1 billion, or 17.6% of total real labour income in the province.

When measuring the impact of an economic activity (such as manufacturing), it is important to examine indirect impacts which stem from the activity. The indirect impacts associated with manufacturing are high, meaning that manufacturing activity is important not only to manufacturers but also to a range of other firms and industries (e.g., primary resource producers, professional services, utilities) that supply manufacturers. Four manufactured commodities (i.e., seafood, other food products, newsprint and refined petroleum) generated a large majority of indirect GDP (85.9%) and employment (79.0%) impacts from manufacturing in 2001. Fish harvesting and logging benefitted the most from manufacturing activity, together receiving more than 30% of the indirect impacts generated.

This report is analytical in nature and does not present policy options or recommendations to facilitate growth. However, the results of the analysis may be used by manufacturers and others to identify areas where future efforts could be directed.

1.0 INTRODUCTION

1.1 Background

Manufacturing is the process of adding value to material resources through processing, fabrication, assembly and/or packaging, and hence transforming these resources into either intermediate goods or finished products. In 2001, over 750 manufacturing firms generated 16,400 person years of employment in the province. The value of manufacturing shipments has exceeded $2 billion annually since 1999, and the direct output, measured in terms of real Gross Domestic Product (GDP), was $732.2 million in 2001.

The manufacturing sector expanded between 1996 and 2001 (13.0% in terms of real GDP and 26.2% in terms of employment). Several factors have contributed to this growth including:

- growth in shellfish processing;
- diversification of manufacturing activity (outside of fish processing and newsprint production);
- the removal of some international and interprovincial trade barriers;[1]
- an increased focus on labour force training;
- increased adoption of new technologies;
- significant investment in transportation infrastructure; and
- a competitive tax regime.

Increased access to international markets allows for specialization in areas in which the province has a comparative advantage[2] and can lead to increased exports and higher standards of living. It creates the potential for new investment, product innovation and the utilization of advanced technologies. Larger markets also allow local manufacturers to take advantage of economies of scale and hence lower their average production costs.

1.2 Facilitating Manufacturing Growth

Governments and industry associations recognize the importance of the manufacturing sector to the economy and generally pursue strategies and initiatives aimed at facilitating its growth. These strategies and initiatives generally follow five themes:[3]

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[1] Major agreements include the North American Free Trade Agreement (1994) and the interprovincial Agreement on Internal Trade (1996). It should be noted that over this period, other trends may have impacted on increased export and trade. For example, the Canadian currency depreciated from 75.9 cents U.S. in January 1994 to 63.3 cents at the end of 2001, and tight U.S. labour markets, combined with strong U.S. demand for goods and services, resulted in new opportunities for trade with that country. Some trade barriers remain with jurisdictions such as the U.S. (e.g., softwood lumber duties) and the European Union (e.g., duties on processed shrimp).

[2] A region has a comparative advantage in the production of a particular commodity if it has a lower opportunity cost (i.e., cost in terms of foregone opportunity to produce other commodities) than that of other regions.

[3] This section is not exhaustive in terms of government initiatives and programs which support industry development. Readers seeking further information should contact the relevant government department or agency.

- **Trade initiatives.** These initiatives include export readiness programs; trade and investment missions; and trade shows which provide exposure for exporters in the national and international marketplace. These initiatives also include negotiation of agreements to reduce and/or remove barriers to trade.
- **Tax policy.** Tax policy instruments include tax holidays, tax reduction initiatives and assistance to manufacturers.[4,5]
- **Strategic planning initiatives.** In 1999, the province and industry released a strategic plan for small scale manufacturing development, and in 2002, the province and craft industry released a strategic plan for the development of that sector. In February 2002, the federal government released a national innovation strategy which seeks to build on manufacturing strengths and address its weaknesses.
- **Human resource development.** Labour force training is increasingly focused on programs which meet the needs of growth industries such as manufacturing. In addition, the federal government has established a network of sector councils to examine human resource issues, several of which are mandated to address human resource issues in the manufacturing sector. [6]
- **Awards and recognition programs.** These initiatives (industry and government-based) recognize excellence in the manufacturing and export sectors.

The manufacturing sector, through Canadian Manufacturers & Exporters, Newfoundland and Labrador (CME-NL), is also pro-active in advocacy and development. CME-NL's mandate focuses on advocacy; provision of timely and relevant information; programs and support to members; networking, learning and professional growth; and promotion of development and utilization of advanced technology. CME-NL is currently pursuing five priority issues including skills, innovation, trade facilitation, climate change, and competitive taxation.

In recent years, government and industry-based initiatives have been successful in facilitating growth in manufacturing in the province. In the context of increased manufacturing activity, CME-NL wished to compile a detailed statistical profile of the sector; to assess the performance of the province's manufacturers relative to other provinces; and to quantify the economic impacts of the manufacturing sector. In this regard, CME-NL commissioned the Economics and Statistics Branch of

[4] At the provincial level, key tax policy instruments include the Economic Diversification and Growth Enterprises (EDGE) program, low corporate income tax rates for manufacturing and processing (M&P), and two tax credit programs. EDGE tax incentives include a minimum ten year tax rebate on provincial corporate income tax, the payroll tax, and some municipal taxes, and a 50% tax rebate on federal corporate income tax. The province's M&P profits tax credit allows a deduction from the provincial Corporate Income Tax, and results in an effective M&P tax rate of 5%, the lowest among provinces. The province offers a 15% Scientific Research and Experimental Development Tax Credit for firms engaged in R&D activity. The Direct Equity Tax Credit is available to individuals who invest in small business and who are prepared to keep their investment for at least five years.

[5] The federal government's corporate tax rate for M&P is 21%. The federal government also provides a 10% Atlantic Investment Tax Credit to offset capital costs incurred by manufacturers.

[6] A complete listing of sector councils, including contact names, can be found at www.hrdc-drhc.gc.ca/hrib/hrp-prh/english/sector/listsectorcouncils_e.shtml

the Department of Finance to provide a statistical profile of the manufacturing sector, to undertake an analysis of the performance of the sector, and to conduct an analysis of the economic impacts of manufacturing in this province.

1.3 Methodology

Statistical Profile Methodology

Using a combination of Statistics Canada (published and custom prepared), the Centre for the Study of Living Standards, and provincial government data, generally covering the 1996 to 2001 period (consistent with the performance analysis), the statistical profile provides a review of 11 indicators. For three indicators—the number of firms, revenues, and productivity—the time frame was altered. Data availability necessitated a change in the time frame for the number of firms and revenues, while for labour productivity, the time period was extended to provide a more appropriate analysis.

Readers should also note that because the fish processing industry is such a dominate player in the manufacturing sector (28% of shipments, 44% of employment) it has been separately mentioned in many of the indicators profiled in the section.

Performance Methodology

This study utilizes a 10 indicator methodology previously used by Canadian Manufacturers & Exporters (CME) to assess manufacturing performance in Canada relative to the other G-7 countries.[7] The analysis examines five provinces (Newfoundland and Labrador, the Maritime provinces, and Ontario) for the 1996 to 2001 reference period. The 10 indicators fall into three general performance areas—output, productivity and competitiveness, and knowledge and innovation—and are as follows:[8]

- Indicator 1: Growth in manufacturing real gross domestic product (GDP) (the *CME study used growth in industrial production*);
- Indicator 2: Growth in real manufactured exports (*this indicator is excluded from the performance ranking in this study due to the unavailability of data for Prince Edward Island and New Brunswick*);
- Indicator 3. Change in manufacturers' selling prices (*this indicator is excluded from the performance ranking in this study due to the unavailability of data for Prince Edward Island and New Brunswick*);
- Indicator 4: Labour productivity growth in manufacturing;
- Indicator 5: Change in manufacturers' unit labour costs;

[7] This methodology was used at the request of CME-NL. The indicators were selected by CME for its international performance assessment based on data availability across G-7 countries, and are generally consistent with indicators used in studies by international economic research agencies. G-7 countries include the United States, Canada, United Kingdom, France, Germany, Italy and Japan. The study found that, on average, Canadian performance was the lowest in the G-7. The CME study, completed in August 2001, was used as input into the CME document, *The Business Case for Innovation* (2001). A summary of the CME study is found in Appendix A.

[8] The CME study did not assess industry performance in terms of tax policy, currency exchange rates, transportation infrastructure, firm management practices, inter-firm linkages, or other such factors.

- Indicator 6: Manufacturers' before-tax profit margins (*the CME study used after-tax profit margins*);
- Indicator 7: Investment in machinery and equipment as a percent of real GDP in manufacturing;
- Indicator 8: Skills training investment as a percent of payroll for all industries;
- Indicator 9: R&D investment as a percent of real GDP in the business sector; and
- Indicator 10: Rate of new product commercialization (U.S. patents) in the business sector.

For each indicator, the best performing province is given a score of 100%, then all other provinces are scored relative to the leader. For example, if the leader had growth of 4% in a particular indicator and another province recorded 2% growth for the same indicator, then that province would be given a score of 50% for that indicator. For two indicators, labour productivity and unit labour costs, a mix of positive and negative results were recorded among provinces and a modification to this methodology was made. In these cases, the leader was given a score of 100%, the weakest performer was given a score of 0%, and the remaining provinces were given a score relative to their positions within the range of the highest and lowest results. Data for Canada as a whole, while not included for purposes of determining performance rankings, was included for comparative purposes.

Modifications to CME Methodology

This report follows a similar methodology as the CME study, subject to data quality and availability. In completing the study, four major data issues were identified, resulting in slight modifications:

- This report uses real GDP (Indicator No. 1) to define output in the manufacturing sector as opposed to the industrial production measure used by CME. Industrial production includes output from the manufacturing, mining, oil, and utilities industries. Manufacturing real GDP is a more appropriate measure to use in analyzing the manufacturing sector as it excludes the impact of growth in other industries. It should be noted, however, that this change likely impeded Newfoundland and Labrador's overall performance given the start-up of offshore oil production in 1997.

- The data required for Indicators No. 2 (growth in real manufactured exports) and No. 3 (change in manufacturers' selling prices) were not available for Prince Edward Island and New Brunswick. Hence, these two indicators were excluded from the overall performance ranking (see Table 1), however, for information purposes the results are presented for those provinces for which data were available.

- This study uses before-tax profit margins as a measure of profitability (Indicator No. 6), while the CME study used manufacturers' after-tax profit margins. While after-tax data is available at the national level, comparable provincial level data is only available for before-tax profit margins. This change had minimal impact, if any, on the overall performance ranking.

- While the reference period for the study was 1996 to 2001, data limitations constrained the reference period for some indicators. Data was available for 1999 only for Indicator No. 8 (skills training investment as a percent of payroll), and for the 1996 to 1999 period only for Indicators No. 2 (growth in real manufactured exports), No. 3 (change in manufacturers' selling prices),

No. 6 (manufacturers' before-tax profit margins) and No. 10 (new product commercialization). As well, data was available for the 1996 to 2000 period only for Indicator No. 9 (business sector R&D investment as a percent of real GDP). Given that Indicators No. 2 and No. 3 were excluded from the overall ranking, and that the remaining indicators identified were based on average performance level over the reference period, these data limitations would not be expected to impact significantly on the overall ranking.

Table 1
Performance Measurement Framework

		Performance Indicator (CME Study)	Performance Indicator (Current Study)
Output	1	Growth in industrial production	Growth in manufacturing real GDP
	2	Growth in real manufactured exports	
Productivity and Competitiveness	3	Change in manufacturers' selling prices	
	4	Labour productivity growth in manufacturing	
	5	Change in manufacturers' unit labour costs	
	6	Manufacturers' after-tax profit margins	Manufacturers' before-tax profit margins
	7	Investment in machinery and equipment as a percent of real GDP in manufacturing	
Knowledge and Innovation	8	Skills training investment as a percent of payroll	
	9	R&D investment as a percent of real GDP in the business sector	
	10	New product commercialization (value of U.S. patents as a percent of real GDP in business sector)	New product commercialization (number of U.S. patents per $1 billion of business sector real GDP)

Adapted from CME, 2001

The data used in this analysis were either published Statistics Canada data or derived from Statistics Canada data.

Limitations to Performance Methodology

While these indicators are fairly comprehensive and address manufacturing performance in a broad context, there are several limitations associated with the methodology and the indicators:

- The CME methodology accorded equal weight to each indicator in determining the overall performance ranking. First, it is debatable whether each indicator is of equal importance. Second, because the composition of the manufacturing sector differs across jurisdictions (e.g., products produced, target markets, seasonality in production cycles, and capital-to-labour ratios), it is also arguable that the importance of each indicator may differ in each province. The CME methodology did not account for such differences.
- The CME methodology was based on change in performance for some indicators and level of performance for other indicators. This means that, in the overall performance ranking with equal

weights assigned to each indicator, it is difficult for any jurisdiction to perform strongly on all indicators. In this study, Indicators No. 1 (real GDP growth), No. 4 (labour productivity growth) and No. 5 (change in unit labour cost) were based on change in performance. These indicators favoured jurisdictions (notably Prince Edward Island) which showed significant positive change over the reference period, regardless of their relative level of performance. The remaining five indicators (No. 6 through No. 10) were based on the average level of performance and favoured jurisdictions (notably Ontario) which had high relative levels of performance but which experienced relatively weaker growth over the period.

- Performance results, in both absolute terms and relative to other jurisdictions, are sensitive to the reference period chosen. For example, over the reference period used (1996 to 2001), Prince Edward Island's manufacturing real GDP grew by 66.7%, significantly stronger than growth of 13.0% for this province and growth of 18.4% for Ontario. If the period was shortened to 1998 to 2001, however, Prince Edward Island's growth rate (13.5%) would have been much more comparable to both this province (10.5%) and Ontario (5.5%). This change, in turn, would have impacted on the results of the analysis for Indicators No. 4 (growth in labour productivity), No. 5 (change in unit labour cost) and No. 7 (investment in machinery and equipment as a percent of real GDP) which use manufacturing real GDP in calculating performance.

- Some datasets, notably the Labour Force Survey, have some margin of error associated with the estimates. In this study, the Labour Force Survey is used to estimate the number of hours worked in calculating Indicator No. 4 (growth in labour productivity). The estimated number of hours worked fluctuates significantly from one year to the next and impacts on the performance ranking.

- The CME study used manufacturing data when available and business sector (i.e., all industries excluding the public sector) data otherwise. This report follows a similar methodology and used business sector data for Indicators No. 9 (R&D investment as a percent of real GDP) and No. 10 (new product commercialization). All-industry data for Indicator No. 8 (skills training investment as a percent of payroll) was used because of data availability issues. It is felt that the use of these broader categories did not impact significantly on the relative performance of the provinces studied.

Despite these shortcomings (presented mainly for completeness), the performance analysis in this report is instructive and provides valuable insights on the manufacturing sector in this province and its relative performance with that of other provinces. Readers should also note that this report is the first manufacturing profile of this nature to be completed in this province and any follow-up work, as suggested in Section 1.4, should seek to build on this analysis and to continue to address weaknesses, wherever possible, in the methodology used.

Economic Impact Methodology

With respect to economic impacts, this report calculates the direct and total (i.e., the sum of direct, indirect and induced) real GDP, employment and real labour income benefits of manufacturing in the province for 2001 (these impacts are defined in Section 4.1). Direct GDP, employment and labour income impacts were taken from Statistics Canada for industries in which data were available. For

industries in which Statistics Canada data were not available (i.e., pulp and paper, refined petroleum, ship (boat building)) impacts were developed by the Economics and Statistics Branch. Indirect impacts were calculated using the Newfoundland and Labrador Input/Output Model (NALIOM) while induced impacts were calculated using the Newfoundland and Labrador Econometric Model (NALEM).

1.4 Relevance of this Study

This study provides a comprehensive overview of the provincial manufacturing sector, including a statistical profile, its performance record relative to other provinces over the 1996 to 2001 period, and its impact on the provincial economy in 2001. More specifically, the study:

- provides new and more detailed information with respect to performance in the provincial manufacturing sector. In this context, it could assist industry in developing and implementing policies and programs to improve performance and facilitate growth and diversification.
- may assist local manufacturers in participating in the federal innovation strategy, and complement other areas of industry research and policy development.
- forms the basis and allows for: (i) new data and data sources to be developed; (ii) development of a provincial-level methodology that could be duplicated and expanded upon by other jurisdictions, and (iii) local stakeholders to develop expertise and become a leader in this area of analysis.
- provides benchmark data from which future analysis could be conducted and changes over time observed.

NALIOM

NALIOM simulates the relationships between commodity outputs and commodity inputs at an industry level under the assumption of linearity (that is, that inputs used by an industry in the past to produce a commodity will be used in the same proportions in future for producing any incremental output). Using Statistics Canada data, NALIOM can provide estimates of GDP and employment impacts of over 700 types of commodity purchases on 300 industries (i.e., the direct impact). The model's strength lies in its ability to capture backward linkages to other industries that arise from the production of one industry's inputs and, in turn, the production of inputs for those industries by their suppliers and so on (i.e., the indirect impact).

NALEM

NALEM is a detailed model of the relationships between key economic variables in the provincial economy and is used by government for economic forecasting as well as to assess the impacts created by major development projects and government policy changes. NALEM contains over 370 mathematical equations and 600 data series which are designed to represent key aspects of the provincial economy, and to capture the relationship between certain socioeconomic variables or indicators. For example, changes in consumer spending can affect government revenues, employment levels, investment spending, and so on; NALEM tries to capture these relationships. NALEM was developed with the assistance and advice of professional and academic economists in Canada and the U.S. and has been in use since 1990.

Section Two of this report provides a detailed statistical overview of the manufacturing sector in this province. Section Three examines and reports on manufacturing performance as outlined in Section 1.3. Section Four outlines the economic impact of manufacturing in the province in terms of real GDP, employment and real labour income for 2001. Finally, Section Five provides concluding statements.

2.0 MANUFACTURING STATISTICAL PROFILE

2.1 Introduction

The manufacturing sector in Newfoundland and Labrador experienced significant structural change in the 1990s. This change was marked by a decline in groundfish processing, a switch into shellfish species such as crab and shrimp, an increase in resource-based manufacturing such as lumber as well as growth in non-resource based manufacturing (e.g., electronics and communications products, and transportation equipment). Manufacturing has grown in terms of output and trade (exports) and has benefitted from significant capital investment programs. Manufacturing activity, however, continues to exhibit strong seasonal fluctuations in production and employment because fish processing, which is very seasonal, continues to account for a large portion of activity—fish processing accounts for about 26% of manufacturing real GDP and about 44% of manufacturing employment. Seasonality in employment impacts on labour income, productivity, and reliance on income support programs such as Employment Insurance.

This profile includes indicators which measure output and trade, as well as indicators which profile manufacturing workers and firms. Statistical tables related to this profile are provided in Appendix B.

Photo credit: Eric Walsh, courtesy of Industry, Trade and Rural Development

Neptune Leatherworks is a family owned clothing and accessories producer in Freshwater, Conception Bay. The business designs and manufactures leather gloves, caps, and scarves.

2.2 Gross Domestic Product

Manufacturing directly accounted for $732.2 million (1997$) in real GDP in 2001 (see Table 2).[9] This represented cumulative real GDP growth of 13% (from $647.9 million) over 1996. The largest industries in the manufacturing sector in 2001, in terms of direct GDP contribution, were seafood processing, other food processing, newsprint production, and petroleum refining. (Section 4 outlines the importance of the different manufacturing industries and their linkages in more detail.)

[9] Real GDP and shipments growth were particularly strong in 1999. This was due to large increases in crab landings and newsprint production.

In terms of its contribution to total provincial real GDP, manufacturing accounted for about 6.4% in 2001, down from an average of about 7% in the late 1990s. The lower share in 2001 was due to the fact that overall provincial real GDP, led by growth in oil production, expanded more rapidly (23.3% between 1996 and 2001) than manufacturing (13.0%). Furthermore, much of the manufacturing sector is reliant on primary resource inputs and consequently output is constrained by resource limitations.

Table 2
Real GDP in Manufacturing
1996-2001

Year	Real GDP (1997 $m)	Percent Change	Percent of total Real GDP
1996	$647.9	-8.1%	7.0%
1997	$653.0	0.8%	6.9%
1998	$662.6	1.5%	6.6%
1999	$766.6	15.7%	7.2%
2000	$772.2	0.7%	6.9%
2001	$732.2	-5.2%	6.4%

Source: Statistics Canada

2.3 Shipment Value

The value of manufacturing shipments increased from $1.58 billion in 1996 to over $2.2 billion in both 2000 and 2001 (see Table 3), representing nominal growth of almost 40% over this period.

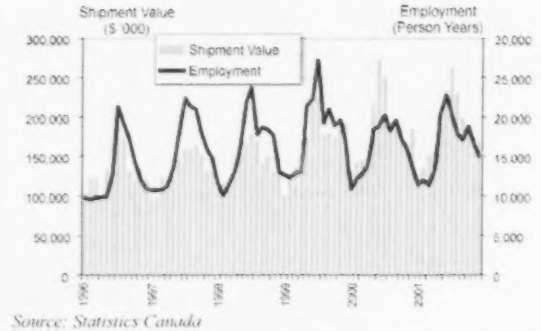
Table 3
Value of Manufacturing Shipments
1996-2001

Year	$Billion[1]	Percent Change
1996	$1.58	-0.6%
1997	$1.61	1.7%
1998	$1.70	6.1%
1999	$2.02	18.7%
2000	$2.23	10.1%
2001	$2.21	-0.9%

1. Data not adjusted for inflation.
Source: Statistics Canada

Seafood and newsprint production were the two largest commodities in terms of shipment value. The value of seafood shipments grew by 36% over the 1996 to 2001 period to about $625 million in 2001. The value of newsprint shipments, while subject to considerable fluctuations, grew by almost 8% from an estimated $628 million in 1996 to $676 million in 2001.

Graph 1
Monthly Shipment Value and Employment
Manufacturing, 1996-2001



Source: Statistics Canada

Seafood processing is a highly seasonal activity and, because this industry accounts for a relatively large share of manufacturing output, the manufacturing sector continues to exhibit significant seasonality in production. Manufacturing shipments peak in the summer months each year (i.e., corresponding with peaks in fish landings), and shipment value during these months is almost double that of the winter

months (see Graphs 1 and 2). As a result, employment also exhibits strong seasonal fluctuations.

2.4 Trade Flows

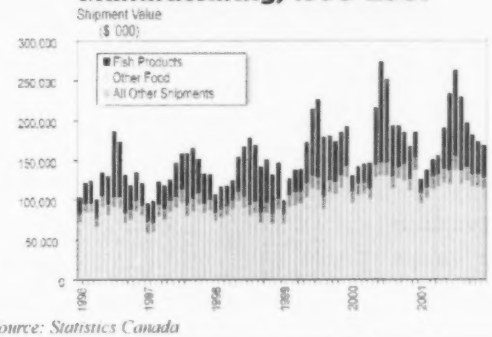
Trade flows are impacted by commodity prices, the supply of raw materials (e.g., fish), the ability of local manufacturers to compete in terms of cost and quality, and changes in market demand. International exports are also sensitive to fluctuations in currency exchange rates. As such, the composition and direction of trade flows varies considerably over time.

Increases in production have flowed mainly to international markets. In terms of market share, about two-thirds of manufactured goods in this province flowed to international markets in 2001 compared to 48% in 1992 (see Table 4). This reliance on international markets is the highest among provinces. The percentage of shipments destined for markets within Newfoundland and Labrador has declined substantially from 1992 to 2001 (from 45% to 24%) while the percentage shipped to other provinces has remained fairly stable at 7%.

The province's manufacturing sector has become more dependent on the U.S. market. The U.S. accounted for over 70% of the province's international exports in 2001 compared to 54% in 1992 (see Table 5). Four commodities (i.e., refined petroleum, seafood products, newsprint and lumber) accounted for almost all of this gain, and in total, these categories currently represent about 99% of the province's manufactured exports to the U.S.

Graph 2

Monthly Shipment Value by Major Component Manufacturing, 1996-2001



Source: Statistics Canada

Table 4
Trade Flows for Manufactured Goods
Selected Years (Percent of Total Trade Flow)

Destination	1992	1997	2001
International	48%	64%	68%
Interprovincial	7%	6%	7%
Intraprovincial	45%	30%	24%

Source: Statistics Canada

Table 5
Major International Manufacturing Markets
Selected Years (Percent of Total Export Value)

Market	1992	1997	2001
U.S.A.	54%	72%	71%
Western Europe	27%	13%	19%
China	<1%	2%	3%
Japan	4%	5%	1%

Source: Industry Canada

2.5 Employment

Average annual employment in manufacturing increased from 13,000 in 1996 to 16,400 in 2001 (see Table 6). The main driver behind the increase has been an increase in fish processing activity which rose throughout the period. Of the 3,400 person year gain over this period, gains in fish processing accounted for 85% of the increase.

Due to the seasonal nature of some manufacturing activities, fish processing in particular, person year estimates do not fully reflect the number of people attached to the sector. Taxfiler data, for example, indicates that about 32,000 individuals were attached to manufacturing in 1998 and 1999 (the most recent year for which data are available), while Labour Force Survey data indicate employment levels of between 16,000 and 18,000 person years.

Fish processing employment remains highly seasonal, peaking in the summer months coincident with the rise and fall of fish landings. In 2001, for example, employment in fish processing during the summer (average of 11,100 from May to July) was three times the level of the winter period (average of 3,700 from January to March). In contrast, employment in other manufacturing industries exhibits less seasonality. In 2001, for example, peak monthly employment was only 1.3 times that of the lowest month.

2.6 EI Program Usage

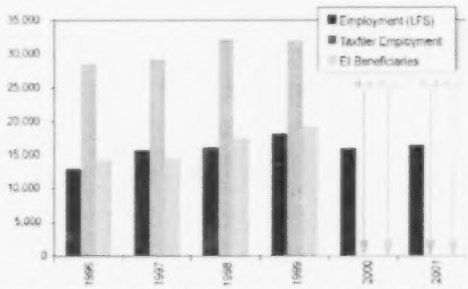
The number of E.I. beneficiaries who indicated their main employment

Table 6
Manufacturing Employment
1996-2001

Year	Employment (person years)	Percent Change	Percent of Total Employment
1996	13,000	11.1%	7.0%
1997	15,700	20.8%	8.3%
1998	16,100	2.5%	8.3%
1999	18,100	12.4%	8.8%
2000	16,000	-11.6%	7.8%
2001	16,400	2.5%	7.8%

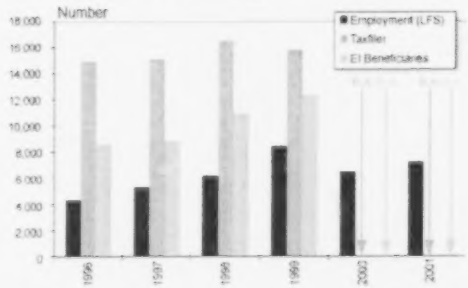
Source: Labour Force Survey, Statistics Canada

Graph 3
Employment and EI Beneficiaries
Total Manufacturing, 1996-2001



Source: Statistics Canada (Labour Force Survey and Special Tabulations)

Graph 4
Employment and EI Beneficiaries
Fish Processing, 1996-2001



Source: Statistics Canada (Labour Force Survey and Special Tabulations)

activity was in manufacturing increased from 14,230 in 1996 to 19,210 in 1999. Within the manufacturing sector, some industries are much more dependent on E.I. than others because of their seasonal nature. In particular, the fish processing industry accounts for about 60% of all manufacturing E.I. beneficiaries.

In 1999, for example, of the 19,210 E.I. beneficiaries, fish processing accounted for 12,310 beneficiaries while the rest of the manufacturing sector accounted for 6,900 beneficiaries.

Table 7
EI Beneficiaries in Manufacturing
1996-2001

Year	Number	Percent Change	Fish Processing as a Percent of Total Manufacturing
1996	14,230	N/A	60.0%
1997	14,520	2.0%	61.0%
1998	17,490	20.5%	63.0%
1999	19,210	9.8%	64.1%

Source: Statistics Canada

This relatively high reliance on E.I. means that fish processing workers depend on E.I. benefits for a higher portion of their annual income than manufacturing workers generally (see Section 2.7).

2.7 Labour Income

Workers in the manufacturing sector, generally speaking, earn higher wages than workers in general. There are some notable exceptions to this, particularly, fish processing.

Average manufacturing wages, as outlined in Table 8, ranged between $570 per week in 1996 to $629 per week in 2001. On a 40-hour work week basis, this equates to an average hourly wage rate ranging between $14.25 and $15.75. Over this period, manufacturing wages remained marginally higher than the all-industry average for the province.

Table 8
Average Weekly Wages in Manufacturing
1996-2001

Year	Weekly Wages	Percent Change	Ratio to Industrial Average
1996	$570	0.1%	1.02
1997	$601	5.3%	1.08
1998	$620	3.3%	1.10
1999	$606	-2.3%	1.05
2000	$606	0.1%	1.02
2001	$629	3.7%	1.04

Source: Statistics Canada

Wages, or earned income, comprise (in most cases) the largest portion of workers' annual income. For some manufacturing workers—particularly fish processing workers—E.I. comprises a significant portion of incomes.

The majority of fish processing workers are seasonally employed. Consequently, they tend to have lower earned incomes and a greater reliance on E.I. benefits than manufacturing workers in general. This, in turn, leads to lower average annual incomes. Nevertheless, annual incomes for fish process-

Table 9
Average Annual Income of Individuals
1996-1999

	Total Manufacturing		Fish Processing		Other Manufacturing		All Industries	
Year	Income	% EI benefits	Income	% EI benefits	Income	% EI benefits	Income	% EI benefits
1996	$23,321	13.4%	$14,678	23.8%	$32,816	8.3%	$19,953	7.8%
1997	$23,284	12.6%	$15,094	22.0%	$31,935	8.0%	$20,198	7.4%
1998	$24,402	13.5%	$17,109	22.8%	$32,057	8.3%	$20,632	7.4%
1999	$26,136	14.7%	$18,273	27.3%	$33,867	8.1%	$21,550	7.7%

Source: Statistics Canada, special tabulation

ing workers rose during the period under examination from $14,678 in 1996 to $18,273 in 1999 and E.I., as a percent of total income, rose from 23.8% to 27.3% (see Table 9). The rise in both income and E.I. is likely the result of rising fish landings during the period (meaning more weeks worked) combined with wage rate gains (resulting in more E.I. benefits). The income levels of workers in other manufacturing activities, however, exhibited a much more stable pattern over the period with income growth of about 3.2%.

2.8 Productivity[10]

There are two main measures of productivity: labour productivity which measures output per unit of labour input; and total factor productivity (TFP) which measures output per unit of labour and capital combined. Labour productivity, at the economy level, has been used as a crude measure of economic well-being, and growth in labour productivity can stem from changes in technology and increases in other inputs. TFP indicates how efficiently all factors of production are utilized in the production process. Gains in TFP can be brought about through worker training, technology advances,

Table 10
Labour and Total Factor Productivity
1989 -2001

Period	Compound Average Annual Growth Rate			
	Labour Productivity		Total Factor Productivity	
	Manufacturing Sector	Provincial Average	Manufacturing Sector	Provincial Average
1989-2001	0.4%	1.3%	-0.5%	0.2%

Source: Calculated from productivity estimates published by the Centre for the Study of Living Standards

[10] Simply defined, productivity is output per unit of input, and productivity growth is the change in this ratio over time. A detailed overview of the importance of productivity is contained in Section 3.2 (Indicator No. 4).

better management practices, and improved economies of scales.

Between 1989 and 2001 (business cycle peaks) labour productivity in the manufacturing sector grew by a compound annual average growth rate of 0.4% compared to overall provincial labour productivity growth of 1.3% annually (see Table 10).

TFP in manufacturing declined at an average annual growth rate of 0.5% over the period, compared with an increase of 0.2% for the entire economy.

Both measures of productivity growth were impacted by the decline in manufacturing output over the 1989 to 2001 period. Real GDP fell from $963.6 million in 1989 to $732.2 million in 2001. The number of hours worked in manufacturing fell by more than GDP allowing for some slight growth in labour productivity. However, capital inputs increased over the period, resulting in a decline in TFP.

Photo credit: Courtesy of the Department of Industry, Trade and Rural Development
Brookfield Dairy Group, in business since 1926, is the largest dairy in the province. The company employs 250 people and has won two provincial Export Awards (1991 and 1996).

2.9 Number of Firms and Firm Size

Manufacturing firms represent about 4.3% of all businesses in the province. There were 757 manufacturing firms registered in the province in 2001, down from 857 in 1998 (see Table 11). This decline is connected, in part, to rationalization and streamlining in seafood and lumber production. Wood product manufacturers and manufacturers of paper and printing materials exhibited the largest decline with a reduction, on a net basis, of 24 firms. Seafood processing experienced a decline of 22 firms, while other food and beverage manufacturers also declined by 22 firms. Regionally, the largest declines occurred in Corner Brook and the surrounding area, the Notre Dame Bay area, and the Great Northern Peninsula.

Table 11
Number of Manufacturing Firms
1998-2001

Year	Number of firms	Percent Change	Percent of Total Firms
1998	857	n.a.	4.8%
1999	875	2.1%	4.9%
2000	823	-5.9%	4.6%
2001	757	-8.0%	4.3%

Source: Statistics Canada

Manufacturing firms, based on employee size, are larger than most businesses. Although most firms (both manufacturers and non-manufacturers) can be considered small businesses (approximately 65% of manufacturers and 80% of all firms

employed less than 10 employees in 2001), the manufacturing sector has a much higher proportion of larger firms than the all-industry average. For example, almost 10% of manufacturing firms employed 100 or more persons in 2001 (versus the all-industry average of just 2%), and 26% of manufacturers had 10 to 99 employees compared to 18% for the all-industry average.

Most firms (62%) are concentrated in four main areas: those engaged in the manufacture of wood products, paper, printing and related goods (153 firms, 20% of the total); seafood preparation (150 firms, 20%); other food manufacturing, beverages and tobacco (85 firms, 11%); and primary and fabricated metals and machinery products (83 firms, 11%).

2.10 Revenues and Cost Structure

Between 1996 and 1999, manufacturers' revenues grew by 15.5%, from $2.31 billion to $2.67 billion (unadjusted for inflation). Firms use these revenues to cover operational and capital costs incurred with maintaining their businesses, and the balance is taken as operating surplus (or business profit) before taxes.

Table 12
Manufacturers' Revenue and Cost Structure
1996-1999

Year	1996	1997	1998	1999
Revenues ($ billion)	**$2.31**	**$2.33**	**$2.30**	**$2.67**
Percent of Revenues used for business costs				
Primary Resource Inputs	37.7%	40.7%	33.2%	37.7%
Manufactured Inputs	14.8%	14.9%	16.0%	13.8%
Communications and Utilities	2.8%	2.9%	3.1%	3.1%
Other Services	15.3%	13.9%	14.4%	14.6%
Labour	16.8%	17.4%	19.4%	19.1%
Sub Total Costs	**87.3%**	**89.8%**	**86.1%**	**88.3%**
Percent of Revenues not used for business costs				
Operating Surplus (before taxes)	**12.7%**	**10.2%**	**13.9%**	**11.7%**

Source: Statistics Canada I/O Tables

As outlined in Table 12, manufacturers' costs consist of five major elements (i.e., primary resource inputs, manufactured inputs, communications and utilities, other purchased services, and labour). Over the 1996 to 1999 period, the largest cost to manufacturers was the purchase of raw materials (about $1 billion or almost 38% of total revenues in 1999). This relatively large share is due to the composition of the local manufacturing sector which is concentrated in industries utilizing primary resource inputs (i.e., fish processing, newsprint production, and petroleum refining).

In total, non-labour costs totalled $1.85 billion or about 70% of total revenues to manufacturers in 1999, and labour costs accounted for a further 19% of revenues. While labour costs consumed less than 20% of revenues throughout this period, its share has expanded.

Operating surplus, before taxes, ranged between 10.2% of revenues in 1997 and 13.9% in 1998.[11]

2.11 Capital Investment

Capital investment may increase the productive capacity and competitiveness of an industry by injecting new technology in the production process. It is also an important indicator of both current and potential future economic growth as well as a barometer of business confidence. Capital investment also enables firms to achieve industry-wide standardization which facilitates trade and technology transfer. For example, in this province, 25 ISO 9001 and related certifications and two ISO[12] 14001 certifications are currently registered to manufacturers. Certified locations include, among others, the three newsprint mills, Terra Nova Shoes, NEWDOCK - St. John's Dockyard Ltd., Air Liquide Canada Ltd. (four certifications), and CHC Composites. In many cases, ISO certification enhances the competitive position of firms and investor perception, and is a prerequisite for obtaining contracts.

Photo credit: Courtesy of Garrison Guitars
Garrison Guitars began manufacturing acoustic guitars in 2001 using its own patented technology, the Griffiths Active Bracing System.[24] The company's 20,000 sq. ft. facility, located in Mount Pearl, employs over 60 people and utilizes the latest manufacturing technology.

Manufacturing investment in Newfoundland and Labrador averaged $125.2 million per year in real terms over the 1996 to 2001 period. Investment peaked in 1998 at $169 million (see Table 13). This peak was related to increased capital spending in petroleum refining in that year. Over the 1996 to 2001 period, three industries accounted for 80% of manufacturing capital investment: petroleum refining; newsprint; and seafood and other food manufacturing combined.

Table 13
Real Capital Investment in Manufacturing
1996-2001

Year	Real Capital Investment (1997 $m)	% Change	% of Total Real Capital Investment
1996	$87.2	-0.3%	3.7%
1997	$114.8	31.6%	3.9%
1998	$169.0	47.2%	5.9%
1999	$125.2	-25.9%	3.5%
2000	$136.5	9.0%	3.8%
2001	$118.6	-13.1%	3.7%

Source: Statistics Canada

[11] While after-tax profit margins are not available, it should be noted that the corporate income tax rate for manufacturing and processing in this province is 5.0%, the lowest in Canada. In other provinces, the rates range from 7.5% in Prince Edward Island to 16.5% in Manitoba.

[12] ISO - International Organization for Standardization.

Over the 1996 to 2001 period, manufacturing accounted for 4.1% of total provincial capital investment. Investment over this period was dominated by mining and oil and gas extraction (average share of 46%) and public administration (11%).

2.12 Labour Relations Environment

The rate of union coverage in the province's manufacturing sector (54.1% of all workers) was higher than the all-industry average (40%) in 2001. There are presently 45 collective agreements in place in the manufacturing industry.

Between 1996 and 2001, there were nine work stoppages in the province's manufacturing sector—four in the newsprint industry and five in food manufacturing. Eight of these nine stoppages occurred between 1996 and 1999, and only one stoppage has occurred since that time (see Table 14).

Table 14
Labour Stoppages
Manufacturing, 1996-2001

Year	Number	Workers Impacted	Person Days Lost
1996	2	498	1,441
1997	1	51	2,142
1998	1	729	82,273
1999	4	827	29,164
2000	0	0	0
2001	1	95	136

Source: Department of Labour

These stoppages resulted in 115,156 person days lost. It should be noted that this period was marked by relatively tumultuous circumstances in the newsprint industry with four work stoppage situations accounting for almost 98% of person days lost in manufacturing. However, long term (five year) collective agreements were negotiated in the newsprint industry in 1999 which has resulted in an increased measure of stability in this industry.

3.0 MANUFACTURING PERFORMANCE

3.1 Introduction and Summary

As indicated in Section 1.3, CME-NL requested that the Economics and Statistics Branch, Department of Finance complete a comparative manufacturing performance analysis for five provinces (Newfoundland and Labrador, the Maritime provinces, and Ontario) for the 1996 to 2001 period. While not included for purposes of determining performance rankings, Canada as a whole was included for comparative purposes. At the request of CME-NL, this analysis was completed using an existing CME methodology modified to address data availability. Readers should also note that the methodology used has several weaknesses and hence the results should be interpreted with these weaknesses in mind.

Prince Edward Island's manufacturing sector emerged as the strongest among the provinces covered in this study (see Tables 15 and 16). Prince Edward Island's performance was the strongest for five of the eight indicators, including real GDP growth, three of four indicators related to productivity and competitiveness (i.e., labour productivity growth, change in unit labour costs, and before-tax profit margins) and one indicator related to knowledge and innovation (i.e., skills training investment as a percent of payroll). Prince Edward Island's performance, in particular, benefitted from the construction of new transportation infrastructure and investment in food manufacturing.

Table 15
Manufacturing Performance, 1996-2001
Newfoundland and Labrador, the Maritime Provinces and Ontario

Performance Area	Performance Indicator	Jurisdictional Leader	Newfoundland and Labrador Relative to Leader
Output	1. Growth in manufacturing real GDP	Prince Edward Island	19.5% 5th
	2. Change in real manufactured exports	Excluded	
Productivity and Competitiveness	3. Change in manufacturers' selling prices	Excluded	
	4. Labour productivity growth in manufacturing	Prince Edward Island	0.0% 5th
	5. Change in manufacturers' unit labour costs	Prince Edward Island	0.0% 5th
	6. Manufacturers' before-tax profit margins	Prince Edward Island	89.9% 4th
	7. Investment in machinery and equipment as a percent of real GDP in manufacturing	Nova Scotia	75.1% 3rd
Knowledge and Innovation	8. Skills training investment as a percent of payroll (all industries)	Prince Edward Island	83.1% 3rd
	9. R&D investment as a percent of real GDP in the business sector	Ontario	12.7% 4th
	10. Rate of new product commercialization in the business sector	Ontario	21.4% 5th
	Overall Performance		**37.7% 5th**

Ontario's manufacturing sector performed second strongest (on average, 13.3 percentage points weaker than Prince Edward Island) and was the jurisdictional leader for business sector R&D investment as a percent of real GDP and new product commercialization. Nova Scotia ranked third overall (18.8 percentage points weaker than Prince Edward Island), and was the jurisdictional leader for investment in machinery and equipment as a percent of real GDP. New Brunswick placed fourth (20.3 percentage points weaker than Prince Edward Island).

Table 16
Provincial Performance Ranking
Manufacturing, 1996-2001

Province	Overall Performance	Performance Gap (relative to Prince Edward Island)
Prince Edward Island	77.2%	n.a.
Ontario	63.9%	-13.3 points
Nova Scotia	58.3%	-18.8 points
New Brunswick	56.9%	-20.3 points
Newfoundland & Labrador	37.7%	-39.5 points
Canada	65.1%	-12.1 points

Newfoundland and Labrador's manufacturing sector ranked fifth in this study (on average, 39.5 percentage points weaker than Prince Edward Island). Newfoundland and Labrador performed relatively well with respect to three indicators: before-tax profit margins, investment in machinery and equipment as a percent of real GDP, and skills training investment as a percent of payroll (see Graph 5). The province's performance was weak for each of the remaining indicators (i.e., real GDP growth, labour productivity growth, change in unit labour costs, business sector R&D investment as a percent of real GDP and new product commercialization in the business sector). While not included in the performance ranking as data for this indicator was available for only three provinces, Newfoundland and Labrador was the jurisdictional leader for change in manufacturers' selling prices.

Graph 5
Manufacturing Performance
Newfoundland and Labrador

Real GDP Growth
Labour Productivity Growth
Change in Unit Labour Costs
Before-Tax Profit Margins
M&E Investment as percent of GDP
Skills Training Investment as percent of Payroll
Business Sector R&D Investment as percent of GDP
New Product Commercialization in the Business Sector

Canada's performance was, on average, 12.1 percentage points weaker than Prince Edward Island. Relative to the jurisdictional leader for each indicator, Canada performed well with respect to before-tax profit margins, R&D investment, and new product commercialization in the business sector. Its performance for the remaining five indicators ranged between 30.7% and 67.3% of the jurisdictional leader.

Section 3.2 reviews each of the eight indicators included in the performance ranking as well as the two indicators excluded from the ranking due to shortcomings in data availability.

3.2 Overview of Performance Indicators

Indicator No. 1:

Growth in Manufacturing Real GDP

Jurisdictional Leader: **Prince Edward Island**

Newfoundland and Labrador's performance relative to leader: **19.5%**

Provincial rank: **5th**

Canadian performance relative to leader: **30.7%**

Table 17
Growth in Manufacturing Real GDP
1996-2001

Province	Real GDP 2001 ($m)	% Change 1996-2001	Performance Measure
NL	$732.2	13.0%	19.5%
PEI	$282.4	66.7%	100.0%
NS	$2,132.8	20.6%	30.9%
NB	$2,533.6	17.3%	25.9%
Ontario	$81,097.5	18.4%	27.6%
Canada	$160,935.0	20.5%	30.7%

GDP is the most comprehensive measure of the value of all goods and services produced in an industry or economy and, as such, can be used to assess change in an economy's ability to produce goods and services.

Prince Edward Island recorded the strongest manufacturing real GDP growth (66.7% between 1996 and 2001) among the five provinces studied. The manufacturing sector in that province was relatively small historically and benefitted recently due to significant capital investments and rapid expansion in food manufacturing (particularly seafood and frozen vegetable production) and by new transportation infrastructure (Confederation Bridge).

The manufacturing sector in Newfoundland and Labrador expanded by 13.0% between 1996 and 2001 led by growth in food manufacturing (excluding seafood), transportation equipment, electronics and communications products, and lumber. Newfoundland and Labrador's performance (19.5% of Prince Edward Island) ranked fifth among the five provinces and was weaker than the nation as a whole (30.7% of Prince Edward Island).

Indicator No. 2:

Growth in Real Manufactured Exports

This indicator was not included in the performance ranking as data were not available for Prince Edward Island and New Brunswick.

Jurisdictional Leader: **Ontario**

Table 18
Growth in Real Manufactured Exports
1996-1999

Province	Exports 1999 (1997$b)	% Change from 1996
NL	$2.7	24.3%
PEI	n.a.	n.a.
NS	$6.6	27.8%
NB	n.a.	n.a.
Ontario	$220.4	29.1%
Canada	$411.3	26.2%

n.a.: not available

Exports (international and interprovincial) are a major contributor to economic activity, and access to new markets allows firms to produce goods and services more efficiently through improved economies of scale. This facilitates specialization of labour, creates employment opportunities, raises productivity and increases living standards. Export growth is also an indicator of an economy's ability to compete in the national and international marketplace.

Real export data were only available for 1996 to 1999. As well, because data were not available for Prince Edward Island and New Brunswick, this indicator was not included in the overall performance ranking. Among the three provinces for which data were available, Ontario recorded the strongest real manufacturing export growth (29.1%) led by gains in transportation equipment, computer equipment, and fabricated metal products.

Over the same period, real manufacturing exports in Newfoundland and Labrador grew by 24.3%, the lowest among the three provinces shown and less than national growth of 26.2%. This province's real export growth was led mainly by gains in seafood production, transportation equipment, electronics and communications products, and lumber.

Indicator No. 3:

Change in Manufacturers' Selling Prices

This indicator was not included in the performance ranking as data were not available for Prince Edward Island and New Brunswick.

Jurisdictional Leader: **Newfoundland and Labrador**

Table 19
Change in Manufacturers' Selling Prices 1996-1999

Province	Price Index 1999 (1997 = 100)	% Change from 1996
NL	101.4	-4.9%
PEI	n.a.	n.a.
NS	102.4	-0.3%
NB	n.a.	n.a.
Ontario	100.7	1.0%
Canada	101.0	1.2%

n.a.: not available

According to the CME methodology and duplicated in this study, lower selling prices are assumed to be indicative of improved competitiveness. This implicitly assumes that manufacturers have the ability to set prices. However, if manufacturers are price-takers, as is generally the case in the local manufacturing sector, lower selling prices may simply result in lower profit margins and do not necessarily indicate improved competitiveness, particularly in the short term. Over the longer term, sustained lower prices are a good indicator of improving competitiveness since less efficient firms will not be able to compete and hence cease to exist.

Manufacturers' selling prices were only available for 1996 to 1999. As well, because data were not available for Prince Edward Island and New Brunswick, this indicator was not included in the overall performance ranking. Among the provinces for which data is available, Newfoundland and Labrador recorded the largest decline in prices. Between 1996 and 1999, manufacturers' selling prices in this province fell by 4.9% driven by lower prices in 1999 for newsprint, refined petroleum and seafood products. The prices for these commodities are determined outside the province and are impacted by global market conditions. Prices for each of these commodities rebounded in 2000 relative to 1999, therefore, the change from 1996 to 1999 may not be an accurate or current indicator of the competitiveness of the provincial manufacturing sector.

Manufacturers' selling prices also declined marginally in Nova Scotia (-0.3%) between 1996 and 1999. Prices, however, increased in both Ontario (1.0%) and Canada as a whole (1.2%).

Indicator No. 4:

Labour Productivity Growth in Manufacturing

Jurisdictional Leader: **Prince Edward Island**

Newfoundland and Labrador's performance relative to leader: **0.0%**

Provincial rank: **5th**

Canadian performance relative to leader: **31.6%**

Table 20
Labour Productivity in Manufacturing, 1996-2001

Province	Labour Productivity 2001 (real GDP per hours worked)	% Change 1996-2001	Performance Measure
NL	$22.97	-9.0%	0.0%
PEI	$21.52	30.4%	100.0%
NS	$24.98	3.0%	30.5%
NB	$32.99	9.6%	47.2%
Ontario	$37.71	-0.9%	20.7%
Canada	$36.62	3.4%	31.6%

Note: Refer to Section 1.3 for calculation of performance measure

A region's standard of living, typically defined as real GDP per capita, can be impacted by a number of factors including: changes in productivity, changes in the employment/population ratio, and changes in terms of trade. While improvements in either of these will result in a higher standard of living, the only sustainable (long term) manner to increase per capita GDP is to increase the amount of output produced per worker, that is, by raising labour productivity. Higher levels of output per unit of labour input translate into higher returns for the factors of production (i.e., labour and capital).[13]

Within the manufacturing sector, labour productivity growth in Prince Edward Island grew by 30.4% between 1996 and 2001, the strongest among the five provinces analyzed.[14] This performance was driven by strong growth in real GDP (66.7%) relative to labour input growth (27.9% growth in the number of hours worked).

Labour productivity in manufacturing in Newfoundland and Labrador declined by 9.0% between 1996 and 2001, the weakest among the provinces studied (as explained in Section 1.3, because labour productivity *declined* and *performed weakest* in the study, this province was given a performance rating of 0.0% for this indicator). This decline is due to the fact that labour input increased

[13] High productivity (or high productivity growth), however, does not necessarily mean a firm is more competitive. Competitors may also be improving their productivity, and other factors which impact on competitiveness but not necessarily productivity (e.g., transportation infrastructure, tax policy, exchange rates) may impact differently on firms in different jurisdictions.

[14] Productivity is best analyzed on a business cycle basis, however given the study's terms of reference, productivity analysis was completed for the 1996 to 2001 period.

much faster over the reference period (24.2% growth in the number of hours worked) compared to growth in real GDP (13.0%).

Newfoundland and Labrador's decline in labour productivity was caused mainly by fish processing. Statistics Canada data indicates a substantial decline in labour productivity in the fish processing industry over the period.[15]

Newfoundland and Labrador's performance was weaker than the national average of 3.4% growth in labour productivity over the 1996 to 2001 period (31.6% relative to Prince Edward Island).

Readers should also note that the methodology is based on productivity growth and hence productivity levels are not considered. Ontario's manufacturing sector had the highest level of productivity among provinces included in this study during the reference period (e.g., a real GDP per hour worked ratio of $37.71 in 2001). **While Prince Edward Island had the highest growth in productivity, Newfoundland and Labrador's labour productivity level exceeded that of Prince Edward Island in five of the six years from 1996 to 2001.**

[15] However, output estimates produced by the Provincial Department of Fisheries and Aquaculture do not support this conclusion. This discrepancy is believed to be a result of data limitations as discussed in Section 1.3.

Indicator No. 5:

Change in Manufacturers' Unit Labour Costs

Jurisdictional Leader: **Prince Edward Island**

Newfoundland and Labrador's performance relative to leader: **0.0%**

Provincial rank: **5th**

Canadian performance relative to leader: **67.3%**

Table 21
Change in Manufacturers' Unit Labour Costs, 1996-2001

Province	% Change 1996-2001	Performance Measure
NL	35.3%	0.0%
PEI	-12.7%	100.0%
NS	-2.9%	79.5%
NB	-3.3%	80.2%
Ontario	3.7%	65.7%
Canada	2.9%	67.3%

Note: Refer to Section 1.3 for calculation of performance measure

Unit labour costs (ULC) measure the ratio of labour compensation (i.e., wages and salaries and supplementary labour income) to real GDP. In other words, ULC is the average cost of labour per dollar of real output. ULC will decrease when labour compensation grows slower than output and, conversely, will increase when labour compensation grows faster. All else being equal, a declining ULC means lower production costs and improved competitiveness. Conversely, if labour compensation consistently grows faster than labour productivity, the result is usually a decline in profitability and competitiveness.[16] Therefore, a decrease in the ULC is preferred to an increase in the ULC.

Prince Edward Island was the strongest performing province in this study over the 1996 to 2001 period with a 12.7% decline in manufacturing ULC. This decrease was the result of stronger growth in real GDP (66.7%) compared to growth in labour compensation (45.5%).

Manufacturers' ULC in Newfoundland and Labrador increased by 35.3% between 1996 and 2001, the weakest performance among the five provinces. This performance was the result of stronger growth in labour compensation (52.8%) compared to real GDP growth (13.0%) over the reference period.

The province also performed weaker than the nation as a whole (67.3% relative to Prince Edward Island).

[16] Increasing wage rates do not necessarily reduce competitiveness, provided there is a corresponding increase in productivity.

Indicator No. 6:

Manufacturers' Before-Tax Profit Margins

Jurisdictional Leader: **Prince Edward Island**

Newfoundland and Labrador's performance relative to leader: **89.9%**

Provincial rank: **4th**

Canadian performance relative to leader: **102.2%**

Table 22
Manufacturers' Before-Tax Profit Margins 1996-1999

Province	Average profit margin 1996-1999	Performance Measure
NL	11.9%	89.9%
PEI	13.3%	100.0%
NS	9.7%	72.8%
NB	12.1%	91.2%
Ontario	12.5%	94.3%
Canada	13.6%	102.2%

Profit margins (or operating surpluses) are an indicator of firm viability (its ability to earn profits), its ability to withstand short term market weakness or reduced market prices, and its ability to re-invest or attract new capital (thereby enhancing capacity and output, productivity and/or ability to innovate).

Manufacturers' before-tax profit margin data were only available for 1996 to 1999. Among provinces included in this study, the average before-tax profit margin over the period was highest for manufacturers in Prince Edward Island (average of 13.3%).

Newfoundland and Labrador ranked fourth in terms of this indicator (89.9% of Prince Edward Island). However, it should be noted that the average before-tax profit margins of manufacturers in four of the five provinces studied ranged between 11.9% and 13.3%, which is a narrow band of only 1.4 percentage points, indicating that there is not a lot of difference among provinces in terms of this indicator. Further, as noted in Section 2.10, the corporate income tax rate for manufacturers is lower in this province than any other province which should enhance the after-tax profit margin position of manufacturers in this province relative to other jurisdictions.

The average before-tax profit margin was higher for Canada than any of the provinces included in this study (102.2% of Prince Edward Island). This strong performance was driven by relative high profit margins for manufacturing in Alberta (15.8%), Quebec (15.6%) and Saskatchewan (14.5%).

Indicator No. 7:

Investment in Machinery and Equipment as a Percent of Real GDP in Manufacturing

Jurisdictional Leader:	**Nova Scotia**
Newfoundland and Labrador's performance relative to leader:	**75.1%**
Provincial rank:	**3rd**
Canadian performance relative to leader:	**59.9%**

Table 23
Investment in M&E as a Percent of Real GDP in Manufacturing

Province	Average 1996-2001	Performance Measure
NL	13.5%	75.1%
PEI	12.7%	70.7%
NS	18.0%	100.0%
NB	15.1%	84.1%
Ontario	10.4%	58.1%
Canada	10.8%	59.9%

Investment in machinery and equipment (M&E) increases productive capacity (i.e., potential output) and labour productivity, enables the adoption of new technologies and generally improves competitiveness. It can also be used to help firms, as indicated in Section 2.11, adopt best practices in terms of management, production, and environmental protection.

Between 1996 and 2001, Nova Scotia manufacturers, on average, invested more in M&E as a percent of real GDP in manufacturing (18.0%) than the other provinces in this study. This performance was aided by an exceptionally strong ratio of 40.8% in 1997 (led by a one-time significant investment in the newsprint industry) or about 2.3 times higher than that province's average from 1996 to 2001.

The average ratio in Newfoundland and Labrador was 13.5% between 1996 and 2001 (75.1% of Nova Scotia). This performance was aided by a relatively high ratio in 1998 (24.2%) driven by a high level of investment in petroleum refining in that year.

The province's ratio for this indicator exceeded the national average over this period. Canada's ratio was 10.8% (or 59.9% of Nova Scotia's performance) and was weaker than all other provinces in this study except Ontario.

Indicator No. 8:

Skills Training Investment as a Percent of Payroll

Jurisdictional Leader: **Prince Edward Island**

Newfoundland and Labrador's performance relative to leader: **83.1%**

Provincial rank: **3rd**

Canadian performance relative to leader: **58.9%**

Table 24
Skills Training Investment as a Percent of Payroll, 1999

Province	Skills Training Investment as a Percent of Payroll, 1999	Performance Measure
NL	1.35%	83.1%
PEI	1.62%	100.0%
NS	1.48%	91.2%
NB	0.95%	58.5%
Ontario	0.73%	44.7%
Canada	0.96%	58.9%

Human resource development (education and training) is increasingly important to productivity and competitiveness, particularly in an era of globalization and rapid technological change. Additionally, academic and empirical studies of labour market performance generally point to a correlation between income growth, educational attainment and labour market outcomes (e.g. wage rates, job creation, job stability, and unemployment rates).

Employers in all industries in Prince Edward Island allocated 1.62% of their gross payroll to workplace training in 1999, the highest among provinces included in this study.

Employers in Nova Scotia and Newfoundland and Labrador also invested a relatively high percentage of their gross payroll to skills training in 1999. Newfoundland and Labrador's performance ranked third highest among provinces in the study (83.1% of Prince Edward Island) and was stronger than the national average (0.96% of payroll allocated for skills training, or 58.9% of Prince Edward Island's performance).

In using these results, readers should note that there are relatively large margins of error associated with the data for smaller provinces. The data were derived from a national survey of about 6,350 firms, including 1,626 firms in Ontario and 777 firms in Atlantic Canada (140 firms in Newfoundland and Labrador).[17] Readers should also note that this performance measure only speaks to employer-based investment in skills training and does not address the overall educational attainment of workers.

[17] A sample size of roughly 400 firms per province would be required for a margin of error of 5%, 19 times out of 20.

Indicator No. 9:

R&D Investment as a Percent of Real GDP in the Business Sector

Jurisdictional Leader:	Ontario
Newfoundland and Labrador's performance relative to leader:	12.7%
Provincial rank:	4th
Canadian performance relative to leader:	75.2%

Table 25
Business Sector R&D Investment as a Percent of Real GDP, 1996-2000

Province	Average 1996-2000	Performance Measure
NL	0.23%	12.7%
PEI	0.17%	9.3%
NS	0.42%	23.3%
NB	0.34%	19.0%
Ontario	1.79%	100.0%
Canada	1.35%	75.2%

Research and development (R&D) is the foundation of knowledge and innovation which is necessary for the development of new products and services. Innovation generally leads to higher productivity, improved competitiveness and higher living standards.

Business sector R&D investment data were only available for 1996 to 2000. The business sector in Ontario invested substantially more in R&D as a percent of real GDP than the other provinces in this study (an average of 1.79% between 1996 and 2000). This performance was driven by a relatively high concentration of R&D institutes and facilities, as well as by strong demand for R&D services, in that province. Over 55% of total Canadian business sector R&D spending between 1996 and 2000 was attributed to Ontario compared to 42% of business sector real GDP.

Business sector R&D investment in Newfoundland and Labrador as a percent of real GDP averaged 0.23% over this period, fourth strongest among the provinces studied (12.7% of Ontario). Over the reference period, Newfoundland and Labrador accounted for 0.2% of business sector R&D spending in Canada but 1.0% of business sector real GDP. Similarly, the Atlantic provinces accounted for only 1.3% of business sector R&D spending in Canada compared to 5.1% of business sector real GDP.

R&D spending in Atlantic Canada is relatively low thereby leading to a relatively weak performance for this indicator. Atlantic Canada, in the Canadian context, is generally considered to have a peripheral resource-based manufacturing sector with lower economies of scale. Conversely, Ontario is in closer proximity to major markets, and has larger manufacturers and larger economies of scale. (Note that the 2001 CME study of G-7 countries reached a similar conclusion for Canada as a whole in comparison to its competitors.) Larger operations and high economies of scale are generally prerequisites for high levels of R&D spending. The relative weakness in Atlantic Canada is being addressed, to some degree, through the federally funded Atlantic Innovation Fund announced in 2001.

Nationally, business sector R&D investment as a percent of business sector real GDP averaged 1.35% between 1996 and 2000 (75.2% of Ontario). The national performance was weaker than that of Ontario, but stronger than each of the Atlantic provinces.

Indicator No. 10:
Rate of New Product Commercialization in the Business Sector

Jurisdictional Leader:	**Ontario**
Newfoundland and Labrador's performance relative to leader:	**21.4%**
Provincial rank:	**5th**
Canadian performance relative to leader:	**82.5%**

Table 26
Rate of New Product Commercialization in the Business Sector, 1996-1999

Province	Total U.S. Patents filed 1996-1999	Patents per $1Billion of Real GDP	Performance Measure
NL	30	1.07	21.4%
PEI	14	1.87	37.5%
NS	108	1.92	38.6%
NB	120	2.45	49.3%
Ontario	5,742	4.98	100.0%
Canada	13,160	4.74	95.2%

Commercializing a new product is usually a complex process involving patenting, meeting various legal and regulatory approvals and standards, attracting investors to fund commercial production, and developing markets for the product. The rate of new product commercialization is linked to R&D capacity, the availability of capital, and the capability of firms to identify market potential and bring new products to market. The benefits of new product commercialization, however, go beyond individual firms and industries. High rates of commercialization over time can lead to increased R&D capacity and specialization, promote an entrepreneurial culture, and enhance investment potential.

Data for this indicator were only available for 1996 to 1999. The number of patents filed in the U.S. per dollar of business sector real GDP was highest in Ontario (almost five patents per $1 billion) over the 1996 to 1999 period. This performance is correlated with that province's strong performance in R&D spending. Ontario accounted for almost 44% of total U.S. patents filed by Canadian firms and over 55% of business sector R&D spending over this period.

Newfoundland and Labrador ranked fifth (21.4% of Ontario) with 30 patents filed in the U.S. between 1996 and 1999, or 1.07 patents per $1 billion of business sector real GDP. This performance is consistent with the 2001 CME study which found that Canada, like Newfoundland and Labrador, competes more on the basis of existing industries, and less on the basis of gains in knowledge and innovation.

Nationally, there were about 4.7 patents filed in the U.S. per $1 billion of GDP (95.2% of Ontario). Similar to business sector R&D spending, the national performance was weaker than that of Ontario, but stronger than each of the Atlantic provinces.

Consistent with the CME methodology, this indicator examined U.S. patents only. If the analysis included both Canadian and U.S. patents, the relative performance of provinces would be unchanged.

4.0 ECONOMIC IMPACT OF MANUFACTURING

4.1 Introduction

Manufacturing is an important source of income and employment for persons directly employed in the sector as well as for persons employed in other industries who supply inputs to manufacturing firms. In this section, real GDP, employment and real labour income benefits are calculated for 2001 using multipliers derived from the macroeconomic models (NALIOM and NALEM) identified in Section 1.3.

Economic impacts are divided into three components:

- *Direct impacts* represent the labour income, business profits, and employment generated by manufacturers;
- *Indirect impacts* represent the additional income, profit and employment that is generated when firms in other industries supply goods and services to manufacturers; and
- *Induced impacts* represent the wealth and employment generated when employees and business owners in the direct and indirect industries spend their incomes.

The following manufacturing industry groupings were used:

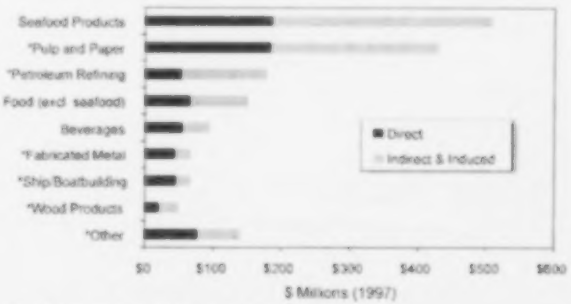
- Seafood products;
- Other food products;
- Beverages;
- Wood products;
- Pulp and paper;
- Petroleum refining;
- Fabricated metal products;
- Ship and boatbuilding; and
- All other manufacturing.[18]

Combined, the first eight categories accounted for 89.4% of manufacturing real GDP in 2001.

Graph 6

Manufacturing Real GDP Impacts

Newfoundland and Labrador, 2001



*Note: * Economics and Statistics Branch estimates*

4.2 Real GDP Impacts

The direct real GDP impact of manufacturing was $732.2 million in 2001. This was about 6.4% of total real GDP for the

[18] Includes textiles, clothing, leather, printing, chemicals, plastics, non-metallic minerals, machinery, computer and electronics, transportation equipment, furniture, and other miscellaneous manufacturing. Combined, these categories directly accounted for 10.6% of real GDP for manufacturing in 2001.

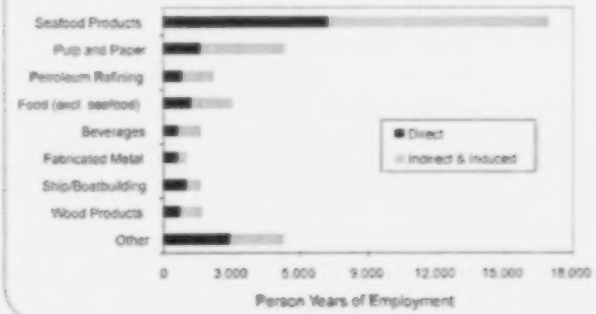
province. The total impact, including direct, indirect and induced impacts, was $1.69 billion, or 14.8% of total economic activity.

The two largest industries were seafood production (which accounted for 25.6% of the direct real GDP impact and 30.2% of the total impact) and pulp and paper (25.1% of the direct impact and 25.5% of the total impact). Other relatively large industries included petroleum refining, food manufacturing (other than seafood) and beverage manufacturing.

4.3 Employment Impacts

Direct employment in manufacturing was 16,400 person years in 2001, or 7.8% of total employment for the province. The total employment impact, including direct, indirect and induced impacts, was nearly 38,500 person years, or 18.2% of total employment for the province.

Graph 7
Manufacturing Employment Impacts
Newfoundland and Labrador, 2001



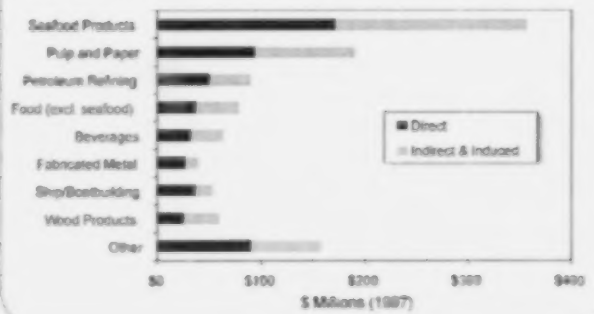
Seafood processing was the largest contributor to employment, accounting for 43.9% of the direct employment and 44.0% of the total employment benefit. This share is relatively high because the indirect impact includes most fish harvesters (fish harvesting gave rise to 7,400 person years of employment in 2001).

Other industries with a relatively large employment impact included pulp and paper (9.8% of the direct impact and 13.9% of the total impact), food excluding seafood (7.7% of the total impact), and petroleum refining (5.7% of the total impact).

4.4 Real Labour Income Impacts

Direct real labour income associated with manufacturing was $560.1 million in 2001, or 9.1% of total labour income for the province. The total real labour income impact, including direct, indirect and induced impacts, was $1.09 billion, or 17.6% of the provincial total.

Graph 8
Manufacturing Real Labour Income Impacts
Newfoundland and Labrador, 2001



Seafood processing, newsprint production and petroleum refining also provided the largest contribution in terms

of real labour income impacts. Seafood processing accounted for 30.5% of direct real labour income and 32.8% of manufacturing's contribution to total provincial real labour income. Newsprint production accounted for 16.7% of direct real labour income and 17.5% of the total impact. Seafood processing's share of real labour income is lower than its share of employment, reflecting lower wage rates and seasonality in the fishery. Conversely, newsprint's share of real labour income exceeded that of employment, reflecting higher paying full-year jobs.

4.5 Overview of Indirect Impacts

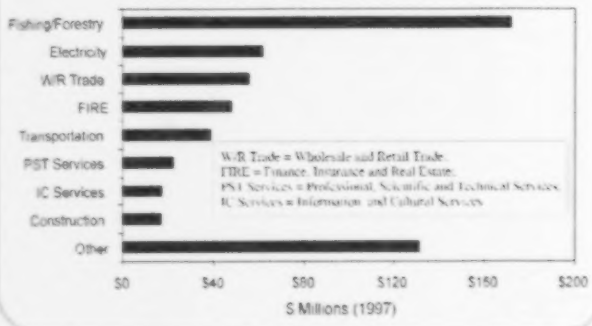
When measuring the economic impact of an economic activity (such as manufacturing) it is important to examine not only the direct economic impact but also the indirect impacts which stem from the activity.

Direct GDP impacts include payments to workers and business owners in an industry and indirect impacts include similar payments by other industries which supply goods and services to that industry. Indirect impacts therefore represent economic activity (i.e., GDP, employment and income) which may not otherwise have been generated. Generally, indirect impacts are spread across a variety of industries. In the case of the manufacturing sector, for example, the production of manufactured goods requires a range of factor inputs such as raw materials, electricity, and wholesale and retail goods.

4.5.1 Indirect Real GDP Impacts

In the manufacturing sector, the indirect economic impact was $564 million in 2001, or about 5% of total real GDP in the province. Four industries (fish processing, other food manufacturing, newsprint production and petroleum refining) stimulated 85.9% of all manufacturing indirect real GDP impacts in 2001.

Graph 9
Indirect Real GDP Impacts by Industry
Manufacturing, 2001



Primary fishing and logging were the largest contributors to indirect real GDP, accounting for 30.4% of the indirect impact (see Graph 9). Other relatively large contributors to indirect real GDP included electric power (11.0%), wholesale and retail trade (9.9%), finance, insurance and real estate services (8.5%), and transportation services (6.9%). The balance of impacts accrued to other industries combined (33.3%).

The composition of indirect real GDP impacts varies considerably by type of manufacturing industry (see Appendix C). For example, newsprint production and petroleum refining use more electric power than other manufacturing industries because of their energy intensive nature.

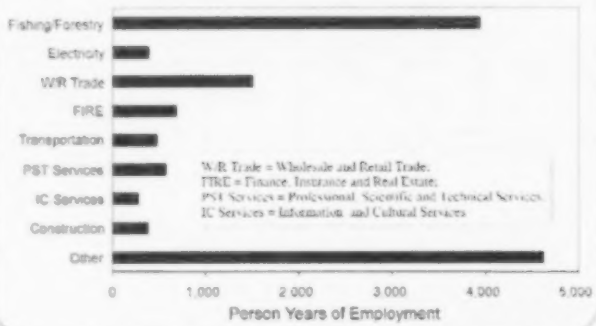
Similarly, transportation services represent a larger portion of total impacts for fish product, beverage, and fabricated metal product manufacturers (combined 9.6%) than for other manufacturers (5.0%) because of their relatively high reliance on road transportation.

4.5.2 Indirect Employment Impacts[19]

The total indirect employment impact stemming from manufacturing is about 12,800 person years, or 6.1% of total provincial employment. Most indirect employment is generated by fish products, other food products, pulp and paper, and petroleum refining (combined impact of about 10,200 person years of employment, or about 79% of manufacturing total indirect employment). These four industries are very reliant on locally produced primary resource inputs, and as such, they produce large indirect impacts.

Graph 10

Indirect Employment Impacts by Industry



Primary fishing and logging activity accounted for 30.5% of indirect employment impacts (roughly the same share as indirect real GDP). There are some noticeable differences, however, with respect to other types of indirect impacts generated by manufacturing. Indirect employment generated in the electricity industry, for example, was about 3.1% of the total compared to 11% for real GDP[20] while finance, insurance and real estate accounted for 5.3% of indirect employment but 8.5% of real GDP. Conversely, wholesale and retail trade's share of indirect employment was 11.6%, exceeding its share of indirect real GDP of 9.9%.

[19] Indirect real labour income impacts are not examined in detail in this study. This impact totalled about $280 million in real terms in 2001 and, like GDP and employment, was concentrated in seafood products, pulp and paper, and other food manufacturing.

[20] This difference relates to the capital intensive nature of this industry. Electricity generation creates significant economic output, yet requires little labour input. Similarly, increases in electric generation generally create minimal incremental direct employment gains.

5.0 CONCLUDING COMMENTS

Newfoundland and Labrador is benefitting from a period of strong economic growth driven not only by the offshore oil industry, but also by growth in other key industries such as manufacturing and customer contact centres, and by growth in the general service sector. Provincial real GDP expanded by 23.3% between 1996 and 2001, and employment increased by 13.0%. Preliminary data indicate that economic performance remained strong in 2002 and most economic forecasters are projecting that strong economic growth will continue in 2003 and beyond as new major projects are developed, export markets strengthen and employment expands.

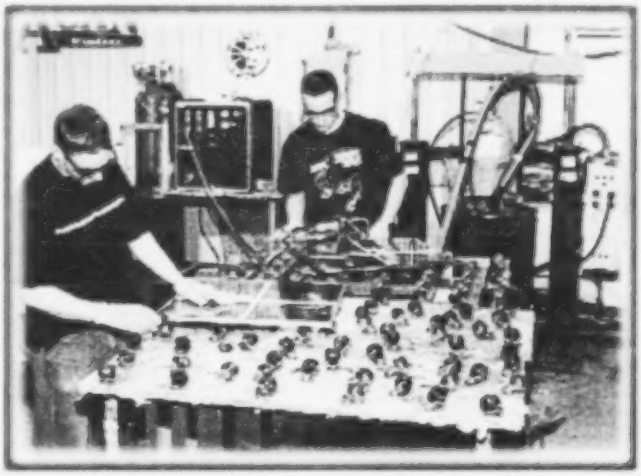


Photo credit: Eric Walsh, courtesy of Industry, Trade and Rural Development
Established in 1989, ACAN is based in Paradise, and specializes in the extrusion, manufacturing, and distribution of vinyl windows, sliding patio doors and swinging garden patio door systems.

Manufacturing has expanded over the past several years, and is a major contributor to economic activity in the province. Manufacturing directly accounted for 6.4% of real GDP and 7.8% of employment in the province in 2001; including indirect and induced impacts, manufacturing contributed 14.8% of real GDP and 18.2% of total employment in 2001.

The indirect impacts associated with manufacturing are high, meaning that manufacturing activity is important not only to manufacturers but also to a range of firms and industries that supply manufacturers as well as to other industries that rely on the incomes of industry workers. Indirect real GDP generated by manufacturers in 2001 totalled over $564 million, and benefitted many other industries including those supplying resource inputs, wholesale and retail goods, transportation, and construction. Indirect employment totalled over 12,800 in 2001, creating about $280 million in indirect real labour income.

Government initiatives such as more favourable trade and tax policies have been pro-active and have led to and reinforced growth and diversification. The benefits of these initiatives can be seen through the successes of Garrison Guitars, CHC Composites, and Exploits Oilskins, among others. At the same time, however, manufacturing continues to be concentrated in four main traditional industries: fish processing, other food manufacturing, newsprint production and petroleum refining. While other (relatively smaller) industries have experienced growth in recent years, they remain small in terms of overall economic impacts.

The performance analysis in this report indicates that there is room for improvement in manufacturing performance in this province relative to the Maritime provinces and Ontario. The manufac-

Photo credit: Eric Walsh, courtesy of Industry, Trade and Rural Development

Restwell Mattresses, which opened in 1991 in Harbour Grace, produces various types of box springs and mattresses for homes, hospitals, hotels, trailers (RVs), and boats. In 1998, the company began producing chesterfield sets, sofa beds, love seats, and wing chairs, and in 2000, it opened a retail store in Carbonear.

turing sector in Prince Edward Island was the strongest performing in this study, followed by Ontario, Nova Scotia, New Brunswick, and Newfoundland and Labrador, respectively. The overall Canadian average was marginally stronger than Ontario. Newfoundland and Labrador manufacturers performed relatively well with respect to three of the performance indicators (before-tax profit margins, skills training investment as a percent of payroll, and investment in machinery and equipment as a percent of real GDP). The province's manufacturing sector performance was relatively weak, however, with respect to the remaining five indicators (real GDP growth, labour productivity, unit labour costs, business sector R&D investment as a percent of real GDP and new product commercialization in the business sector).

While the indicators used in the study are fairly comprehensive and address manufacturing performance in a broad context, readers should be aware of the limitations of the methodology as described in Section 1.3, including: equal weights are applied to each indicator, regardless of its importance to overall performance; performance ratings are sensitive to the reference period chosen; some data have high margins of statistical error; and differing industry composition across provinces make interprovincial comparisons difficult to interpret. Nevertheless, the findings of the study are insightful and instructive, and provide a broad overview of some of the strengths and weakness of the manufacturing sector in the five provinces studied.

This report is analytical in nature and does not present policy options or recommendations to facilitate growth. However, the results of the analysis may be used by manufacturers and others to identify areas where future efforts could be directed.

APPENDIX A

Summary Note

Canada's Excellence Gap: Benchmarking the Performance of Canadian Industry Against the G-7

Canadian Manufacturers & Exporters
August 2001

In August 2001, Canadian Manufacturers & Exporters (CME) released a report, *Canada's Excellence Gap*, comparing the performance of the manufacturing sector in the G-7 countries based on a ten indicator methodology. The findings of this report were subsequently used in the 2001 CME document *The Business Case for Innovation.*

Canada's Excellence Gap benchmarked Canadian performance against the world's seven leading economies using ten indicators designed to assess the competitive success of manufacturers. These economies (i.e., the G-7) included Canada, the United States, Japan, Germany, France, Italy, and the United Kingdom.

Table 27
How Does Canadian Industry Compare?

Indicator	G-7 Leader	Canada (relative to leader)
Industrial Production	United States	96%
Exports	United States	85%
Selling Prices	Japan	52%
Labour Productivity	United States	56%
Unit Labour Costs	United States	72%
Profitability	United States	67%
Capital Investment	United States	63%
R&D	Japan	24%
Skills Training	Japan	35%
Commercialization	United States	36%
Average	United States	62%

Source: CME, 2001

Canadian performance over the 1995 to 2000 period was measured as a percent of the G-7 leader over this period. An overall performance rating was then calculated as an average across all benchmarks of competitive performance. The excellence gap was defined as the difference between this rating and a perfect score of 100%.

Canada's manufacturing sector performed, on average, 62% as well as the G-7 leader, and the excellence gap was therefore 38% of G-7 best practice (see Table 27 and Graph 11). This performance was the weakest in the G-7.

The United States (Canada's largest trading partner) performed the best overall in terms of the competitiveness indicators used in the analysis. The U.S. led the G-7 in seven out of the ten indicators, and held an overall rating of 94% (thus, an excellence gap of 6%). Japan performed second best (82%), and the European countries ranged from 72% to 78% (see Graph 12).

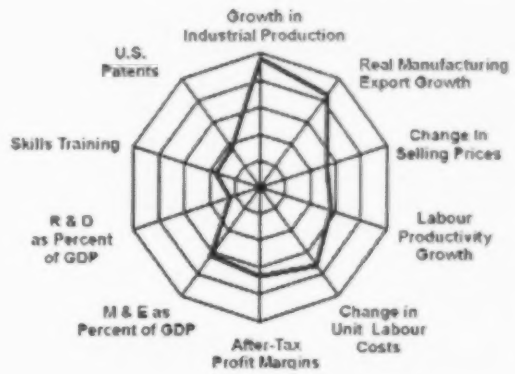
In the CME study, Canadian manufacturers were relatively competitive in terms of production and export growth, but less so in terms of productivity, profitability, and investment. There was also a significant gap with respect to innovation (i.e., training, research and development, and the commercialization of new products).

CME concluded from this analysis that there is less tendency in Canada to compete on the basis of new products, new processes, the use of new technologies, and the development of new skills, and greater reliance on other factors such as the low value of the Canadian dollar, slower growth in labour costs, and (until recently) strong U.S. market demand.

Graph 11

Canada's Excellence Gap

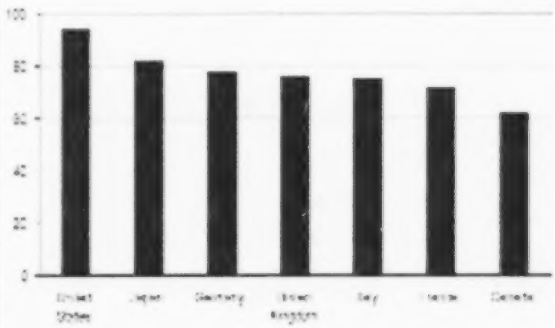
(taken from Canada's Excellence Gap, CME, 2001)


Growth in Industrial Production
Real Manufacturing Export Growth
Change in Selling Prices
Labour Productivity Growth
Change in Unit Labour Costs
After-Tax Profit Margins
M & E as Percent of GDP
R & D as Percent of GDP
Skills Training
U.S. Patents

Graph 12

G-7 Competitiveness Rankings

(taken from Canada's Excellence Gap, CME, 2001)



APPENDIX B

MANUFACTURING STATISTICAL DATA

Indicator	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Employment											
Labour Force Survey (000)	19.1	15.9	15.9	13.1	11.7	13.0	15.7	16.1	18.1	16.0	16.4
% Change	---	-16.8%	-0.0%	-17.6%	-10.7%	11.1%	20.8%	2.5%	12.4%	-11.6%	2.5%
% of Total Employment	9.3%	8.2%	8.3%	6.8%	6.0%	7.0%	8.3%	8.3%	8.8%	7.8%	7.8%
Number of EI Beneficiaries											
Total Manufacturing						14,230	14,520	17,490	19,210		
% Change							2.0%	1.6%	5.6%		
% of Total Beneficiaries						14.0%	14.9%	17.7%	18.4%		
Fish Plant Workers (%)						60.1%	61.0%	63.0%	64.1%		
Other Manufacturing (%)						39.9%	39.0%	37.0%	35.9%		
Average Weekly Wages (SEPH)											
Total Manufacturing	$532.45	$546.27	$561.23	$572.25	$569.35	$570.17	$600.53	$620.23	$605.68	$606.43	$628.76
% Change	--	2.6%	2.7%	2.0%	-0.5%	0.1%	5.3%	3.3%	-2.3%	0.1%	3.7%
Ratio to Industrial Aggregate Wage	1.01	1.01	1.01	1.02	1.02	1.02	1.08	1.10	1.05	1.02	1.04
Manufacturing Shipment Value											
Shipment Value ($m)		$1.23	$1.28	$1.38	$1.59	$1.58	$1.61	$1.70	$2.02	$2.23	$2.21
% Change			3.8%	7.7%	15.1%	-0.6%	1.7%	6.1%	18.7%	10.1%	-0.9%
Real Gross Domestic Product											
Real GDP ($m 1997)	$815.2	$669.5	$717.8	$707.5	$704.8	$647.9	$653.0	$662.6	$766.6	$772.2	$732.2
% Change	-7.2%	-17.9%	7.2%	-1.4%	-0.4%	-8.1%	0.8%	1.5%	15.7%	0.7%	-5.2%
% of Total Real GDP	8.9%	7.4%	7.9%	7.5%	7.4%	7.0%	6.9%	6.6%	7.2%	6.9%	6.4%
Capital Investment											
Total Investment ($m)	$107.9	$65.0	$51.8	$53.9	$89.4	$89.5	$114.8	$181.1	$133.7	$144.9	$130.1
% Change		-39.8%	-20.3%	4.1%	65.9%	0.1%	28.3%	57.8%	-26.2%	8.4%	-10.2%
Construction ($m)	$41.7	$11.5	$12.7	$7.9	$9.0	$12.8	$41.1	$13.9	$41.3	$78.9	$29.4
% Change		-72.4%	10.4%	-37.8%	13.9%	42.2%	221.1%	-66.2%	197.1%	91.0%	-62.7%
Machinery and Equipment ($m)	$66.2	$53.5	$39.1	$46.1	$80.4	$76.8	$73.8	$167.1	$92.4	$66.0	$100.8
% Change		-19.2%	-26.9%	17.9%	74.4%	-4.5%	-3.9%	126.4%	-44.7%	-28.6%	52.7%
Total Investment ($m 1997)	$120.3	$70.8	$54.7	$54.1	$87.5	$87.2	$114.8	$169.0	$125.2	$136.5	$118.6
% Change		-41.2%	-22.8%	-1.1%	61.8%	-0.3%	31.6%	47.2%	-25.9%	9.0%	-13.1%

(Continued)

Indicator	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
International Manufacturing Exports (Percent of Total Exports)											
United States		54.0%	53.3%	47.0%	48.4%	57.7%	72.3%	72.5%	72.3%	77.4%	71.0%
Western Europe		27.2%	17.1%	22.4%	19.6%	20.4%	13.4%	13.2%	13.8%	12.0%	19.4%
South America and Mexico		6.9%	5.8%	8.0%	6.3%	4.4%	3.5%	3.0%	2.8%	2.1%	1.7%
China and Japan		4.1%	10.9%	9.9%	16.0%	11.0%	6.9%	6.5%	6.0%	4.1%	3.5%
Rest of the World		7.8%	12.9%	12.7%	9.6%	6.5%	3.9%	4.7%	5.0%	4.4%	4.4%
Number of Manufacturing Firms											
Total (Business Registry)								857	875	823	757
MAJOR COMPONENTS											
Seafood Product Preparation & Packaging								172	178	168	150
Newsprint Mills								3	3	3	3
All Other								682	694	652	604
DETAILED CATEGORIES											
Food, Beverage, Tobacco								279	288	261	235
Textiles, Clothing, Leather, and related								35	34	37	34
Wood products, paper, printing and related								177	174	166	153
Petroleum, coal, chemicals, plastics, rubber								47	51	42	34
Non-Metallic Mineral Products								50	45	50	46
Primary and fabricated metals and machinery								94	93	84	83
Computer & electronics, electrical & appliances								32	38	31	27
Transportation Equipment								50	52	53	52
Furniture and Related Products								37	40	38	35
Miscellaneous								56	60	61	58

APPENDIX C

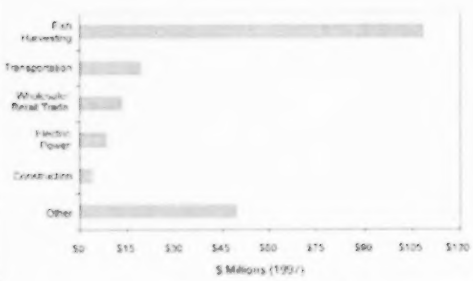
INDIRECT IMPACTS BY INDUSTRY

2001

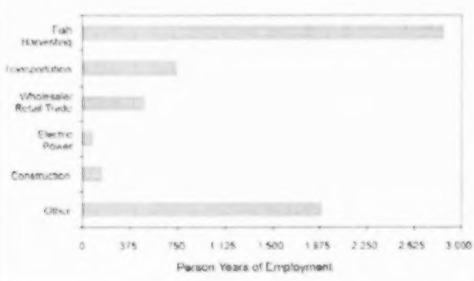
The following graphs outline the indirect real GDP and indirect employment impacts for manufacturing industries as identified in Section 4.0.

Note that the scale for Graphs 13 and 14 (seafood products) is larger than the scale for Graphs 15 to 30. The scale in held constant for Graphs 15 to 30 to allow for comparison of impacts across the industries. The scale for Graphs 13 and 14 is larger to accommodate the larger indirect impacts associated with fish products manufacturing.

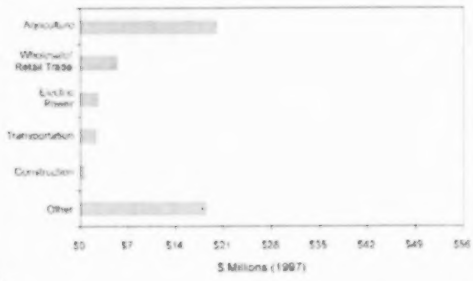
Graph 13
Indirect Real GDP Impacts
Seafood Products, 2001



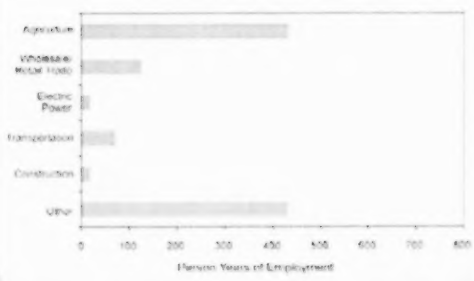
Graph 14
Indirect Employment Impacts
Seafood Products, 2001



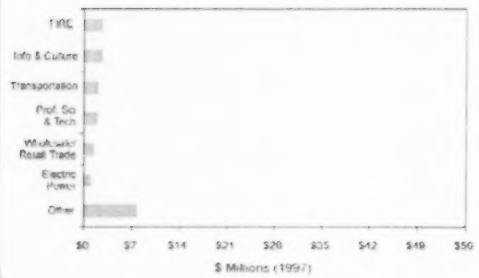
Graph 15
Indirect Real GDP Impacts
Food Manufacturing (excluding seafood), 2001



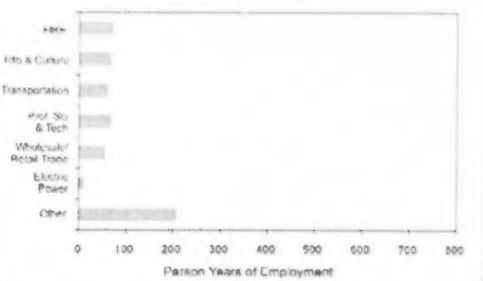
Graph 16
Indirect Employment Impacts
Food Manufacturing (excluding seafood), 2001



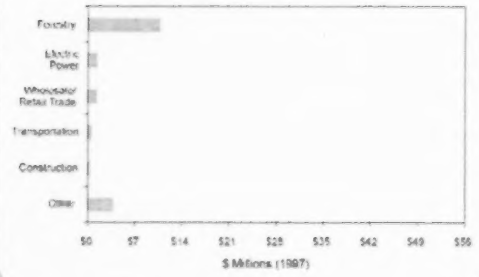
Graph 17
Indirect Real GDP Impacts
Beverages, 2001



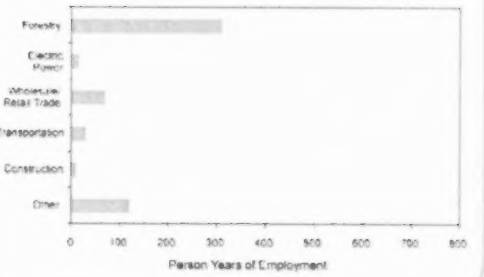
Graph 18
Indirect Employment Impacts
Beverages, 2001



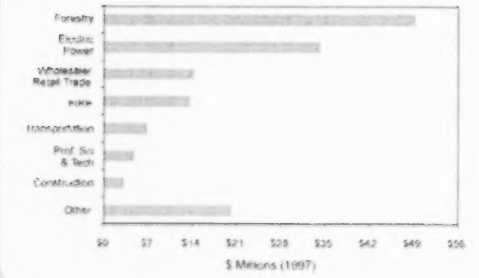
Graph 19
Indirect Real GDP Impacts
Wood Products, 2001



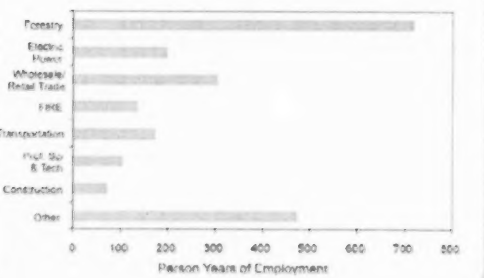
Graph 20
Indirect Employment Impacts
Wood Products, 2001



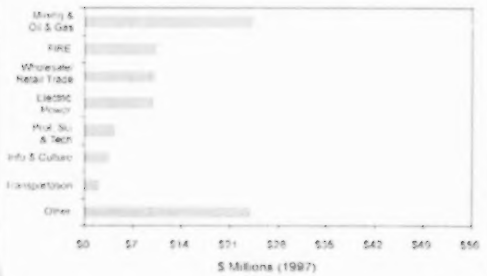
Graph 21
Indirect Real GDP Impacts
Pulp and Paper, 2001



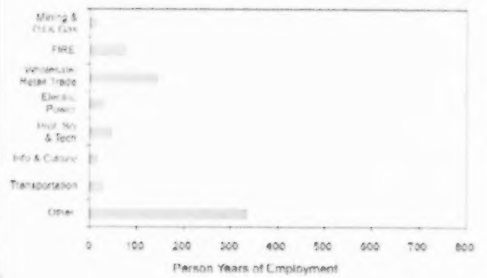
Graph 22
Indirect Employment Impacts
Pulp and Paper, 2001



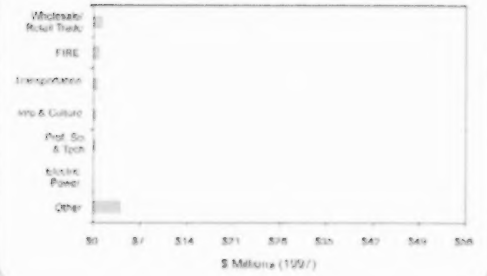
Graph 23
Indirect Real GDP Impacts
Petroleum Refining, 2001



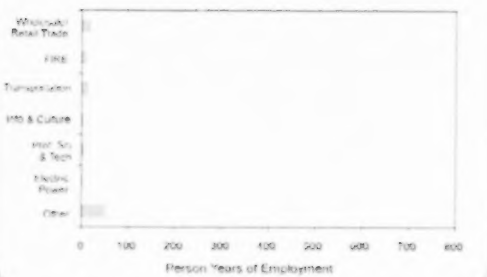
Graph 24
Indirect Employment Impacts
Petroleum Refining, 2001



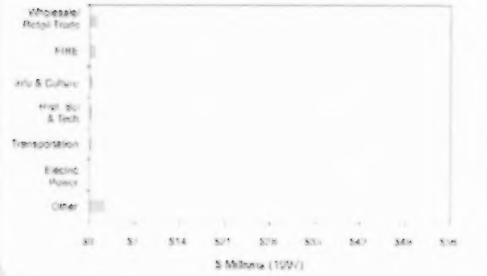
Graph 25
Indirect Real GDP Impacts
Fabricated Metal Products, 2001



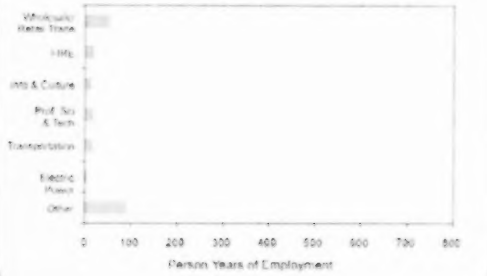
Graph 26
Indirect Employment Impacts
Fabricated Metal Products, 2001



Graph 27
Indirect Real GDP Impacts
Ship and Boatbuilding, 2001



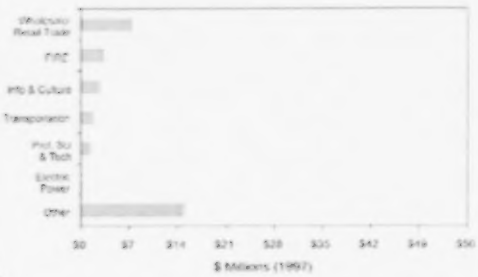
Graph 28
Indirect Employment Impacts
Ship and Boatbuilding, 2001



Graph 29

Indirect Real GDP Impacts

Other Manufacturing, 2001



Graph 30

Indirect Employment Impacts

Other Manufacturing, 2001